1976

Report of the National Marine Fisheries Service for the Calendar Year 1976

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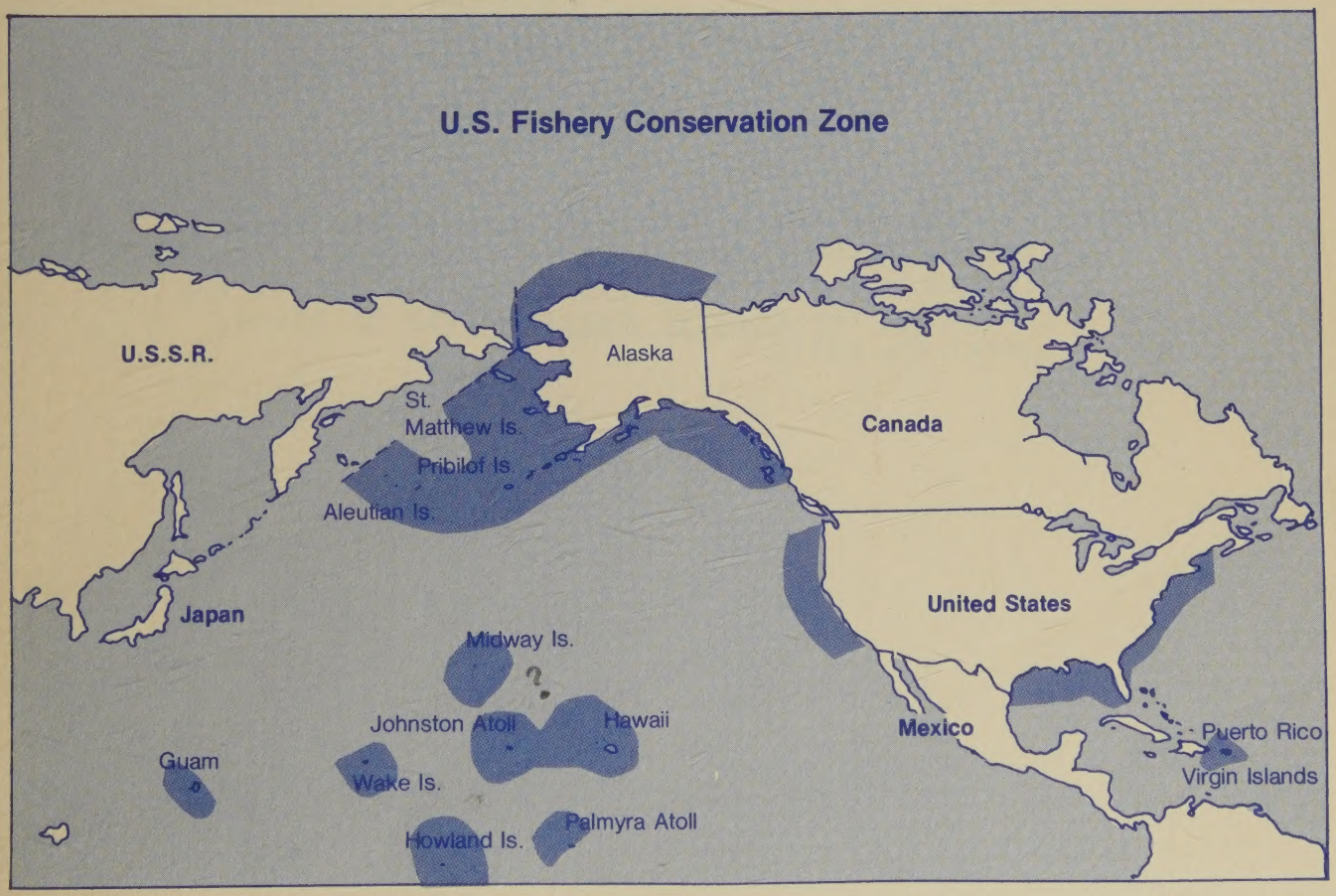


U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

COVER: The map is not an official map of the United States Fishery Conservation Zone (FCZ). The latest official description of the FCZ is set forth in the Federal Register (42 FR 12937, March 7, 1977).

Report of the National Marine Fisheries Service for the Calendar Year 1976

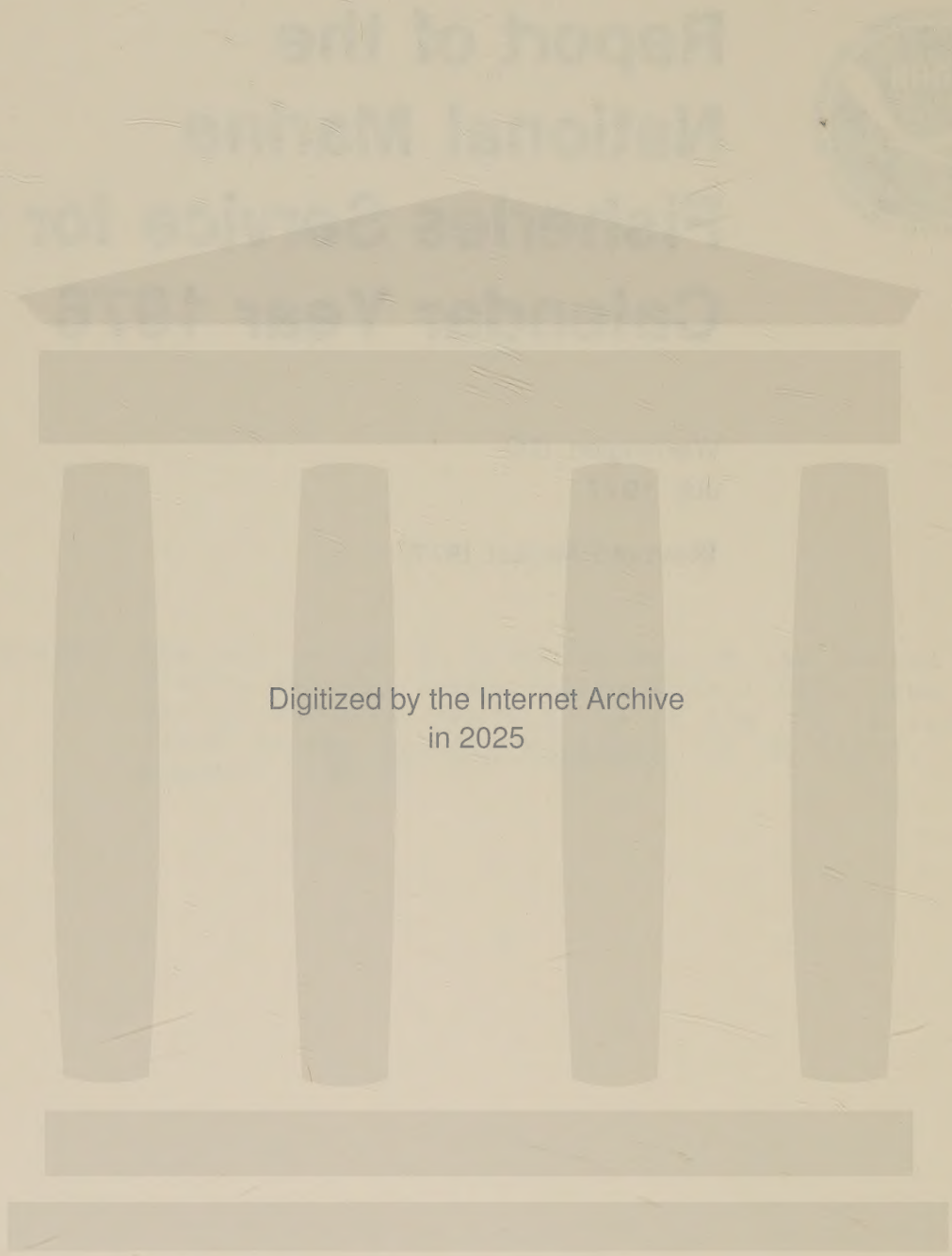
Washington, D.C.
July 1977

(Revised August 1977)

U.S. DEPARTMENT OF COMMERCE
Juanita M. Kreps, Secretary

National Oceanic and Atmospheric Administration
Robert M. White, Administrator

National Marine Fisheries Service
Robert W. Schoning, Director



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THE SECRETARY OF COMMERCE
Washington, D.C. 20230

July 18, 1977

Sirs:

I have the honor to send you the National Marine Fisheries Service Report for the Calendar Year 1976.

The report describes programs and activities, significant accomplishments, state of the U.S. fisheries, mission, and organization. It reflects the progress made in achieving the goals of research, utilization, and management of our marine fisheries resources in the national interest.

Sincerely,

Juanita M. Kreps

Juanita M. Kreps

Enclosure

President of the Senate
Speaker of the House of Representatives

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INTRODUCTION

This report, required by Section 9(a) of the Fish and Wildlife Act of 1956, as amended 16 U.S.C. 742h(a), covers the programs and activities of the National Marine Fisheries Service (NMFS) for calendar year 1976.

It describes (1) the state of the U.S. fisheries in calendar year 1976, (2) the mission and organization of NMFS, and (3) the activities, programs, and significant accomplishments.

KEYSTONE FOR U.S. FISHERIES

There has been a serious depletion of marine fishery resources during the past decade and a weakening of the American fishing industry. Since fisheries are a vital source of food, we must now restore both our fisheries and our industry. The Congress has provided the Nation with a new opportunity. Early in 1976, it enacted the Fishery Conservation and Management Act of 1976. Signed by the President on April 13, 1976, the new law represents not only the efforts and concern of the Congress but also those of the Department of Commerce and other interested agencies of the Executive Branch, State governments, the commercial fishing industry, recreational fishermen, and interested members of the public. The Act provides a basis in law for a strong national program for the conservation and management of our fishing resources--to prevent the depletion of our fish stocks through overfishing, to rebuild stocks that have been overfished, and to conserve and manage our fisheries so that the Nation may develop their full potential. And with such a program, to expand the U.S. fishing industry and provide new opportunities for recreational fishermen. The Fishery Conservation and Management Act of 1976 does not stand alone. Over the past twenty years, the Congress has enacted a number of statutes affecting one aspect or another of fisheries management. But the 1976 Act is the most significant fisheries legislation in the Nation's 200-year history and is the keystone of a national program for our marine fisheries.

STATE OF THE FISHERIES

U.S. commercial fishery landings at ports in the United States were a near-record 5,350 million pounds (round weight), valued at a record $1.4 billion exvessel in 1976. The quantity landed was 11 percent more than in 1975 and slightly less than the 1962 record of 5,354 million pounds. More landings of certain edible and industrial species caused the increase.

U.S. flag vessels also landed at ports outside the United States 174.3 million pounds of tuna valued at $50.0 million (principally in Puerto Rico), and 7.8 million pounds of shrimp valued at $15.1 million (at Caribbean ports).

Commercial landings in the United States of edible species in 1976 were 2,760 million pounds, valued at $1,264 million--up 14 percent in quantity and 40 percent in value from 1975. The quantity was the largest since 1952 and considerably above the average for the previous 5 years. Record landings of two important species--tuna (486 million pounds) and shrimp (404 million pounds)--and improved landings of crabs (345 million pounds), salmon (309 million pounds), flounders (165 million pounds), and cod and other groundfish (157 million pounds) accounted for a large share of the increase.

Landings at U.S. ports of species used for reduction to fish meal and for other industrial purposes were 2,590 million pounds valued at $89 million in 1976. This quantity, 7 percent greater than in 1975 and 5 percent above the average for the previous 5 years, was short of the record landings in 1962. The value of the landings in 1976 was second to the record in 1973. The increase in quantity was due to heavy landings of menhaden, which more than offset a decline in landings of anchovies.

In 1976, U.S. exvessel prices (received by fishermen and vessels for their landings) moved upward in most months and were at, or near, record levels by the end of the year. The largest gains were for shellfish. The same upward movement was apparent in wholesale prices for fresh, frozen, and canned fishery products.

Marine recreational fishery landings for 1970 (the most recent year for which data are available) by sport fishermen were an estimated 1.6 billion pounds of marine (saltwater) finfish, or about the same as the average amount of edible finfish landed by commercial fishermen in recent years.

The value of domestic production of processed fishery products (edible and industrial) was $3.2 billion in 1976, 22 percent more than in 1975. The value of edible products, comprising about 90 percent of the total, was almost $2.9 billion--up 23 percent in 1976. The

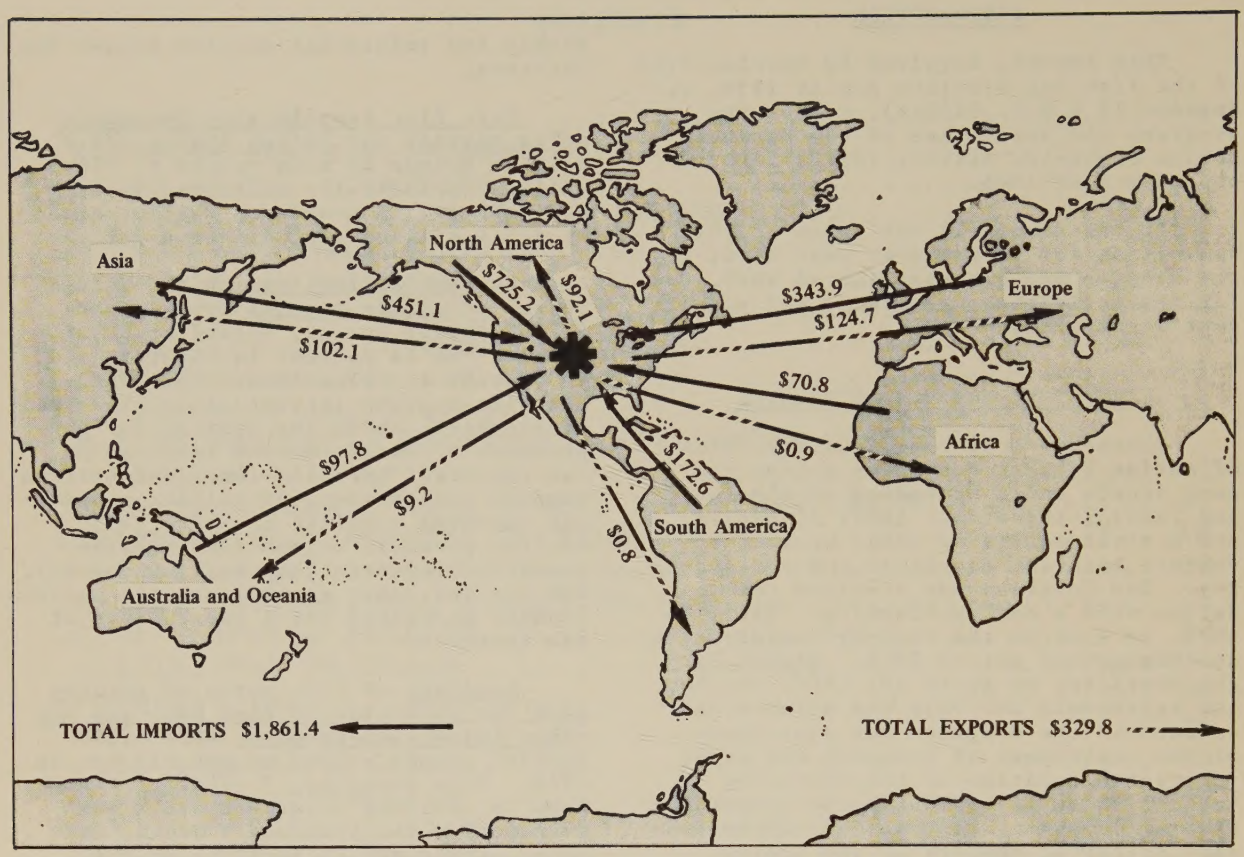

Figure 1.-U.S. foreign trade in edible fishery products, 1976 (million dollars).

value of all major categories of edible products increased, with the greatest increase in the value of canned products of $1.2 billion in 1976. The value of industrial products in 1976 was $377 million, up 16 percent from 1975. Most of the value increase in industrial items was in fish meal, oil, and solubles.

The value of U.S. imports of edible and industrial fishery products was a record $2,277 million in 1976, up 39 percent from 1975. Imports of edible products reached 2,206 million pounds, valued at $1,861 million. Imports of all major categories increased--fillets, blocks, tuna for canning, lobsters, shrimp, canned sardines, canned tuna, and canned oysters. Imports of industrial products rose to a record $416 million (see fig. 1).

Total U.S. exports of edible and industrial fishery products were valued at $382 million in 1976--up 25 percent from 1975 (see fig. 1).

The U.S. supply of commercial fishery products (domestic landings plus imports, round weight equivalent) was 11.6 billion pounds in 1976--14 percent more than in 1975. Edible fish and shellfish were 64 percent of the total supply. Imports provided 63 percent of the edible products and 38 percent of the supply of

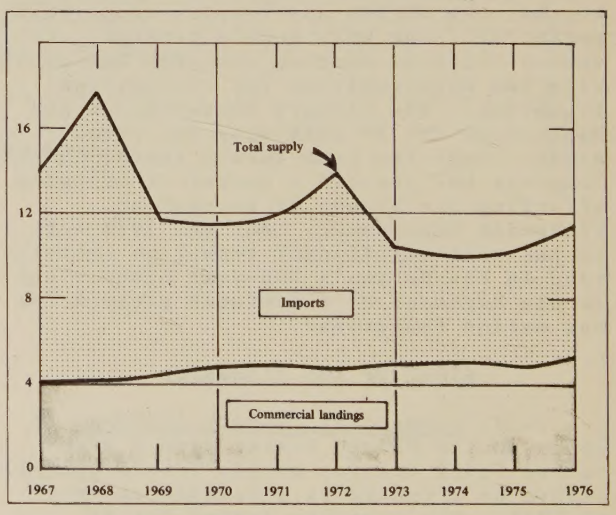

Figure 2.-U.S. supply of edible and industrial fishery products, 1967-76 (billion pounds, round weight).

industrial products in 1976 (see fig. 2).

In 1976, U.S. fishery products consumption reached 12.9 pounds of edible meat per person, tying the record set in 1973. This was 0.7 pounds more than the 12.2 pounds eaten in 1975 (see fig. 3).

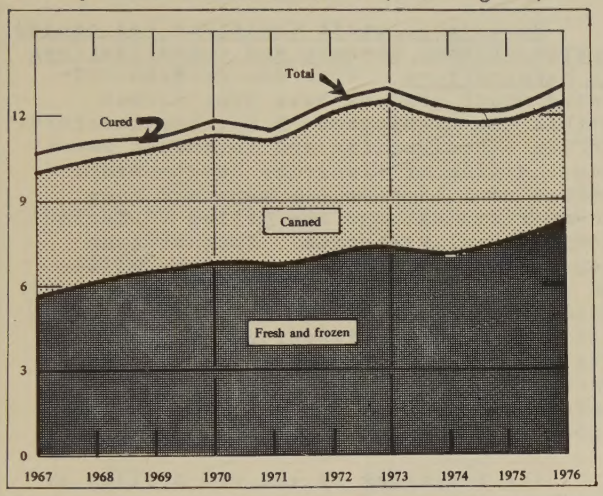

Figure 3.-U.S. per capita consumption of commercial fish and shellfish, 1967-76 (pounds of edible meat).

World fishery landings were 69.7 million metric tons (153.7 billion pounds) in 1975 (the latest year for which data are available)--down 1 percent from the 1974 production of 70.5 million metric tons (155.4 billion pounds). Japan, with 15 percent of the total landings, continues to be the world leader in fishery landings, followed by the U.S.S.R. with 14 percent. The Peoples Republic of China was third, with 10 percent; followed by Peru, 5 percent; and the United States, 4 percent. The United States ranked fifth for the third consecutive year.

NATIONAL PLAN FOR MARINE FISHERIES

A Marine Fisheries Program for the Nation, 1/ published by the Secretary of Commerce in July 1976, was the culmination of several years of work in developing a 10-year plan for the fisheries of the Nation.

The program is presented in six parts. The first part deals with the actual conservation and management of fisheries. Conservation and management of our fisheries have many facets but one underlying purpose--to secure the optimum yield from each fishery on a continuing basis.

The second part is concerned with preservation of fish habitats. To a considerable extent conservation and management of our fisheries turn on the protection and preservation of habitats. If we cannot maintain a healthy and productive marine environment, there will be few fish. It is essentially an environmental problem and requires the establishment of proper standards, monitoring, and research.

The third part is concerned with how the Federal Government, in cooperation with the industry, can help it to realize the new opportunities. The conservation and management of our fisheries and the preservation of fish habitats will in their turn enhance the economic opportunities for our commercial fishing industry. But this will not happen by itself. The industry will require considerable technical and financial assistance.

The fourth part recognizes the needs of marine recreational fishermen. While their immediate concern is the pleasures of recreational fishing, they make an important contribution to the American dinner table. Marine recreational fishermen also need assistance, particularly as they grow in number and increase the pressure on the stocks available for recreational fishing. Recreational fishermen must have access to sufficient fish stocks, and the Department of Commerce must ensure that fishery management plans take their interest into account.

The fifth part focuses on research and development in support of aquaculture to produce fish for both food and recreation. Over the long term, conservation and management may not be enough. If we are to meet our constantly increasing needs for fish and shellfish, particularly for stocks that are limited and are in high demand, we must devise ways of increasing production. Aquaculture offers a large opportunity here.

The sixth and final part will materially affect the fish and shellfish that reach the American dinner table. It deals with the quality of the fish we consume. The goal is to ensure that the fish offered the consumer is wholesome and meets consistent high standards of quality.

1/ Sold by Superintendent of documents, U.S. Government Printing Office, Washington, D.C. 20402 (Stock No. 003-020-00123-8).

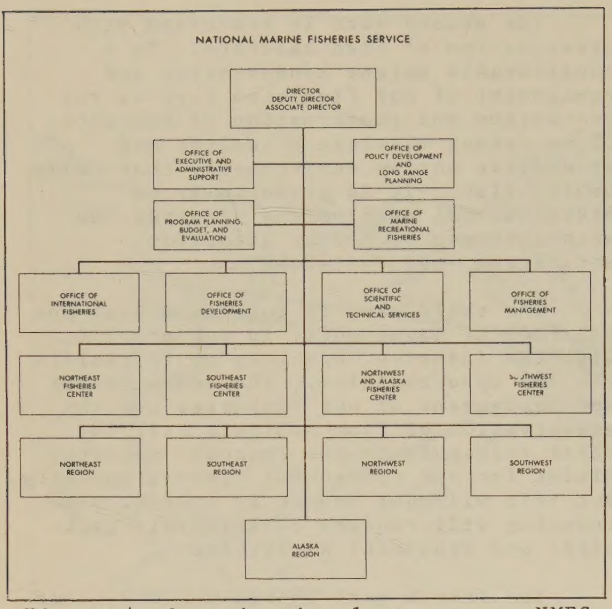

Figure 4.-Organizational structure, NMFS

o An implementation plan for the program (as outlined in the Report) is currently under development and is expected to be approved by the Secretary in the fall of 1977.

MISSION AND ORGANIZATION

A program of research and services related to the protection and rational use of living marine resources for their aesthetic, economic, and recreational value is conducted by NMFS. Included are projects (1) to determine how the varying natural environment and man's activities affect living marine resources; (2) to foster the efficient and judicious use of these resources; and (3) to achieve their domestic and international management, use, and protection.

In 1976, NMFS realigned its organization and functions to administer the new and expanded responsibilities in fisheries management under the Fishery Conservation and Management Act of 1976. (Figure 4 shows NMFS' overall organizational structure).

The reorganization focuses on policy development and managerial guidance at the headquarters level, emphasizes long-range planning and program evaluation, consolidates the management and planning of fisheries research and utilization functions, delegates more authority and operational responsibility to field units, and streamlines the organization of the headquarters staff units.

The Director, assisted by a Deputy Director, formulates basic policies. The new position of Associate Director executes the policy decisions of the Director, and allocates and manages NMFS resources.

Realigning staff functions has caused organizational changes and consolidations at headquarters. Four new program-oriented staff offices have been formed within the Washington, D.C., headquarters: Office of Scientific and Technical Services; Office of Fisheries Development; Office of Policy Development and Long Range Planning; and the Office of Marine Recreational Fisheries. Four offices remain basically unchanged: the Office of International Fisheries; the Office of Executive and Administrative Support; the Office of Program Planning, Budget, and Evaluation; and the Office of Fisheries Management. (Figure 5 details the Washington, D.C., headquarters organization.)

The functions of the new Offices at Headquarters are as follows:

Office of Scientific and Technical Services---assists the Director in the planning, coordinating, and managing research and technical programs nationwide. It provides the principal technical expertise necessary to advise the Director on biological, technological, and economic research objectives, the adequacy of scientific and technical programs, and recommends actions to ensure their integration nationally. Also, it provides policy interpretation and implementation guidance to Center and Regional Offices, as appropriate, for programs in marine habitat protection and other environmental concerns, including habitat investigations, fisheries oceanography, coastal zone management, the Columbia River River Fisheries Development Program, environmental impact statement review and liaison, and research in microconstituents. The Office serves as the Director's focus for the nationwide resource assessment program (MARMAP), aquaculture research, development of fishery research engineering, socio-economic research, and programs for statistics and data management in support of fisheries management and development responsibilities.

Office of Fisheries Development--provides staff advice and review at the national level on financial assistance programs, harvesting and marketing technology, regional fisheries development programs, foreign trade, voluntary inspection and grading programs, and product

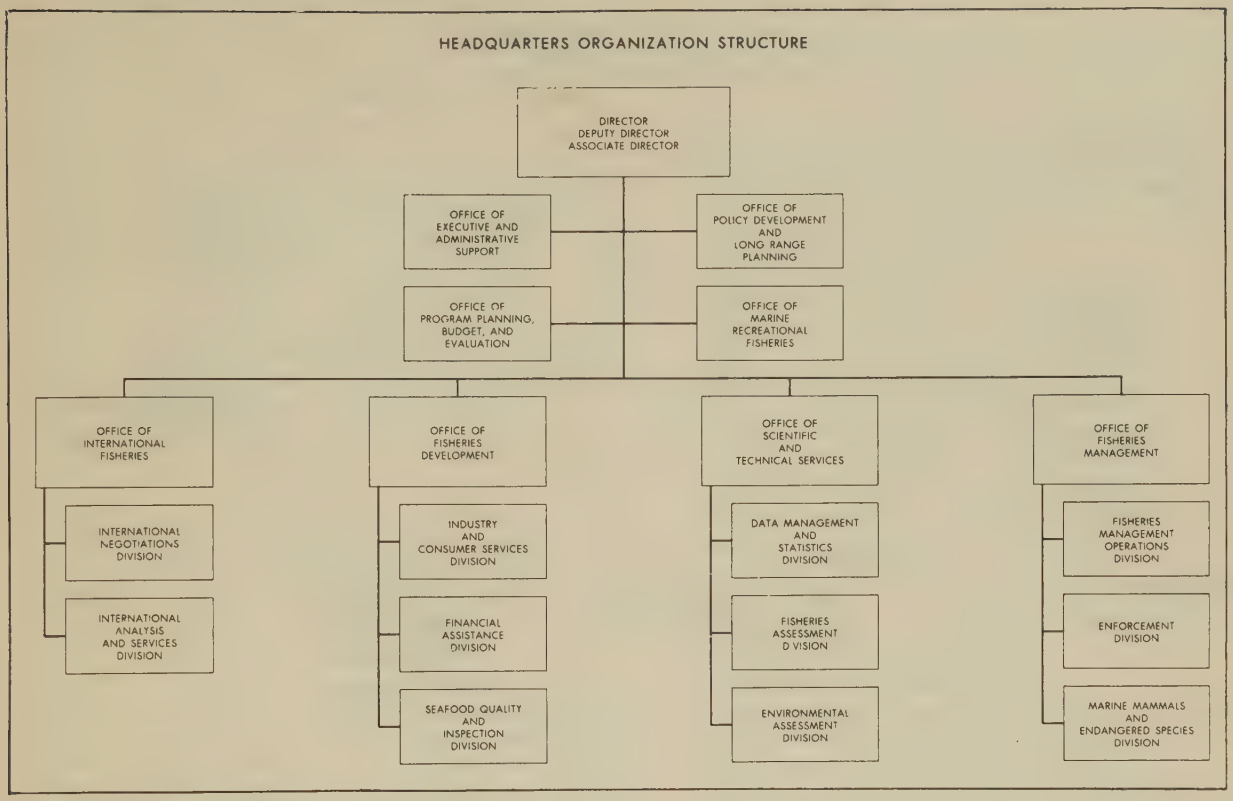
HEADQUARTERS ORGANIZATION STRUCTURE
DIRECTOR
DEPUTY DIRECTOR
ASSOCIATE DIRECTOR
OFFICE OF EXECUTIVE AND ADMINISTRATIVE SUPPORT
OFFICE OF POLICY DEVELOPMENT AND LONG RANGE PLANNING
OFFICE OF PROGRAM PLANNING, BUDGET, AND EVALUATION
OFFICE OF MARINE RECREATIONAL FISHERIES
OFFICE OF INTERNATIONAL FISHERIES
INTERNATIONAL NEGOTIATIONS DIVISION
INTERNATIONAL ANALYSIS AND SERVICES DIVISION
OFFICE OF FISHERIES DEVELOPMENT
INDUSTRY AND CONSUMER SERVICES DIVISION
FINANCIAL ASSISTANCE DIVISION
SEAFOOD QUALITY AND INSPECTION DIVISION
OFFICE OF SCIENTIFIC AND TECHNICAL SERVICES
DATA MANAGEMENT AND STATISTICS DIVISION
FISHERIES ASSESSMENT D VISION
ENVIRONMENTAL ASSESSMENT DIVISION
OFFICE OF FISHERIES MANAGEMENT
FISHERIES MANAGEMENT OPERATIONS DIVISION
ENFORCEMENT DIVISION
MARINE MAMMALS AND ENDANGERED SPECIES DIVISION

Figure 5.-Headquarters organization structure, NMFS.

standards for seafoods.

Office of Policy Development and Long-Range Planning--reviews, evaluates, and coordinates Federal policies and their impact on fishery programs; conducts studies of new theory, techniques, and procedures to achieve optimum yield from each fishery; and performs analyses to assess future needs for fishery research, management, and data management.

Office of Marine Recreational Fisheries--coordinates the planning and development of a diversified program in marine recreational fisheries, and cooperates with other Federal, State, and private organizations.

In the field, seven existing fisheries research centers and three existing utilization research centers have been consolidated into four regional fisheries centers (see fig. 6) responsible for both biological/environmental and fisheries utilization research. This change decentralizes authority and consolidates management responsibility for NMFS research.

No fisheries laboratories will be closed or relocated as a result of the reorganization, but all research units will report directly to one of four regional fisheries centers instead of to Washington, D.C., headquarters.

Northeast Fisheries Center Woods Hole, Massachusetts	Southeast Fisheries Center Miami, Florida
Woods Hole Laboratory Woods Hole, Massachusetts Narragansett Laboratory Narragansett, Rhode Island Gloucester Laboratory Gloucester, Massachusetts Sandy Hook Laboratory Highlands, New Jersey Milford Laboratory Milford, Connecticut Oxford Laboratory Oxford, Maryland National Systematics Laboratory Washington, D.C. Atlantic Environmental Group Narragansett, Rhode Island	Miami Laboratory Miami, Florida Pascagoula Laboratory Pascagoula, Mississippi Galveston Laboratory Galveston, Texas Panama City Laboratory Panama City, Florida National Fish. Engineering Lab. Bay St. Louis, Mississippi Port Aransas Laboratory Port Aransas, Texas Beaufort Laboratory Beaufort, North Carolina College Park Laboratory College Park, Maryland
Southwest Fisheries Center La Jolla, California	**Northwest and Alaska Fisheries Center Seattle, Washington**
La Jolla Laboratory La Jolla, California Tiburon Laboratory Tiburon, California Honolulu Laboratory Honolulu, Hawaii Pacific Environmental Group Monterey, California	Seattle Laboratory Seattle, Washington Auke Bay Laboratory Auke Bay, Alaska Kodiak Laboratory Kodiak, Alaska

Figure 6.-NMFS' Fisheries Centers and their component units

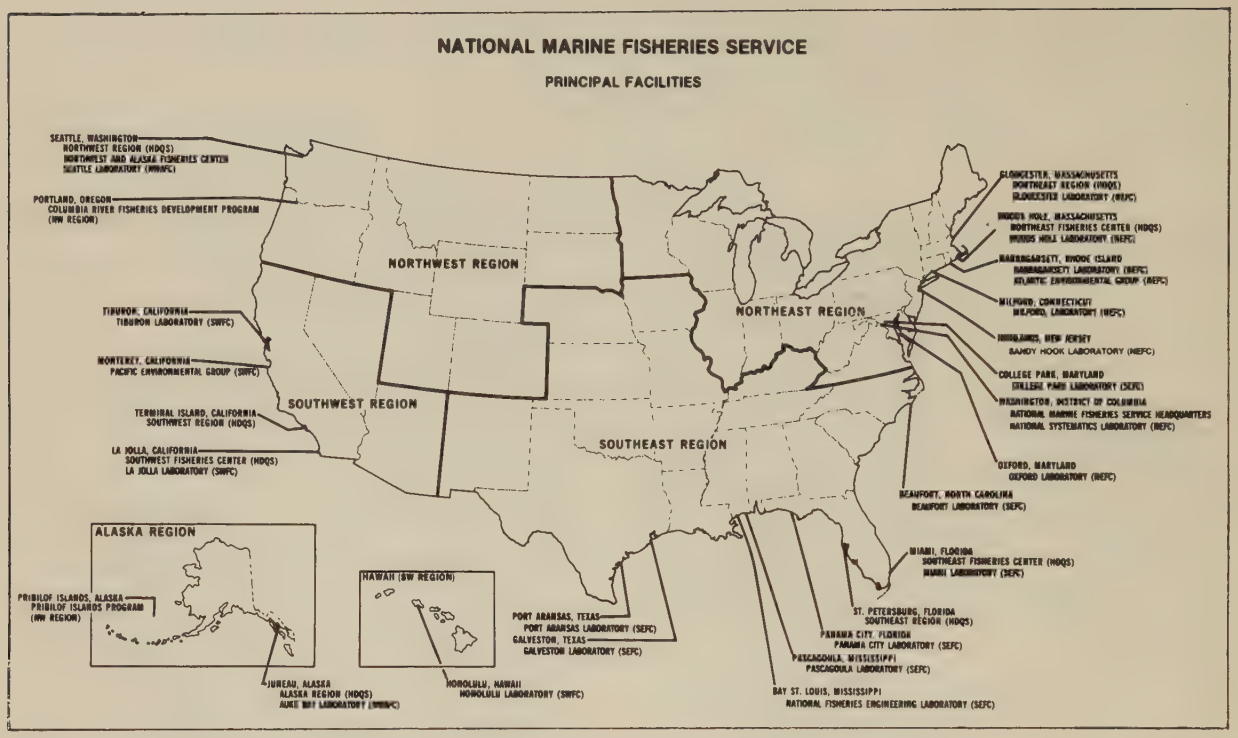

Figure 7.-NMFS Regions and the principal field facilities.

Additionally, the centers are now responsible for conducting socio-economic research required to develop fisheries management plans under the provisions of the Fishery Conservation and Management Act of 1976.

The four centers also provide scientific research support to the Regional Fishery Management Councils established by the Act.

Program direction and control has been further decentralized from Washington, D.C., to the five NMFS Regional Offices (located in Gloucester, Mass., St. Petersburg, Fla., Terminal Island, Calif., Seattle, Wash., and Juneau, Alaska). (Figure 7 shows the NMFS Regions and their boundaries and the principal facilities.)

Moreover, new functions stemming from extended jurisdiction will be added to regional responsibilities. Administrative and technical support to the Regional Fisheries Management Councils will be given by the Regional Offices; Regional Directors, under the Act, will serve as members of the Councils.

FISHERIES MANAGEMENT

NMFS is responsible for the overall administration and implementation of Public Law 94-265--the Fishery Conservation and Management Act of 1976 (FCMA). In addition, NMFS develops broad criteria and guidelines for managing fisheries as a national resource, and fosters State/Federal fishery management cooperation and integration of efforts for multi-jurisdictional fisheries.

In 1976, the major program thrust was to implement NMFS responsibilities under FCMA. The enactment of FCMA on April 13, 1976, offers a rational means to assure the growth and vitality of the U.S. marine fisheries resources and their use for the greatest overall benefit to the Nation. Government, industry, and the public have joined efforts with determination and enthusiasm to accomplish the goals of the Act.

The first step established the Regional Fishery Management Councils. Charters for the Councils, required by the Federal Advisory Committee Act, were filed on July 21, and 138 members were appointed or designated by the Secretary to the eight Councils by August 11.

With the assistance of NMFS interim support staffs, the Councils were able to operate shortly after their formation. An orientation conference for Council members was held on September 13-17, in Arlington, Virginia, to discuss procedures to implement the Act. During the Conference, Councils made necessary arrangements to hold their

initial organizational meetings in their respective geographical areas. At the same time, an Operations Manual developed for the Councils was issued to provide them with information and guidance during their formative phase. In addition, Interim Regulations were published to establish standards for Council operations and guidelines for developing fishery management plans. A model financial management system was also prepared for adoption by the Councils.

Councils started to meet regularly in late September and early October. By the end of 1976, they had become operating entities; initial steps were taken to prepare plans to define fishery management units, establish priorities, and review data needs.

o In addition to administrative and financial management assistance, technical support was provided to Regional Fishery Management Councils by NMFS Regional Offices and Research Centers. NMFS staff members attended organizational meetings of the Councils to give technical information and advice on scientific matters when requested. Each Council received an overview report on the fishery resources of its respective geographical area; work was begun to prepare a series of detailed reports on the specific fisheries selected as management units. A number of information and advisory reports were also prepared.

o In cooperation with the Department of State, actions were initiated to control foreign fishing within the fishery conservation zone in accordance with the Act. In anticipation of receiving foreign fishing permit applications before March 1, 1977, and recognizing that Councils might not be fully organized and capable of preparing fishery management plans necessary to control foreign fishing before that time, NMFS Regional Offices and Research Centers in July 1976 began preparing preliminary management plans (PMPs). By the end of the year, plans for 16 fisheries had been prepared. The plans identify that portion of the optimum yield for fishery resources that will not be harvested by domestic fishermen and, accordingly, the total allowable catch by foreign fishermen.

o Because no fishing permit applications had been received from foreign governments at the time, the draft PMPs were distributed as draft environmental impact statements (DEISs) to comply with the requirements of the National Environmental Policy Act of 1969. Copies were widely distributed to the general public (including the newly-formed Councils) so they could participate as fully as possible in the final decisions of these plans.

The following DEISs were developed:

1. Troll Salmon Fishery of the Pacific;
2. Trawl Fishery of Washington, Oregon, and California;
3. Sablefish of the Bering Sea and the Northeastern Pacific;
4. High-Seas Salmon Fishery of the Eastern Bering Sea and Northeast Pacific;
5. Trawl Fishery of the Gulf of Alaska;
6. Trawl Fisheries and Herring Gillnet Fishery of the Eastern Bering Sea and Aleutian Islands;
7. Shrimp Fishery of the Eastern Bering Sea and the Gulf of Alaska;
8. King and Tanner Crab Fisheries of the Eastern Bering Sea;
9. Seamount Groundfish Fishery of the Pacific;
10. Precious Coral Fishery of the Pacific;
11. Hake Fisheries of the Northwestern Atlantic;
12. Squid Fisheries of the Northwestern Atlantic;
13. Atlantic Herring Fishery of the Northwestern Atlantic;
14. Finfish Caught Incidental to the Trawl Fisheries of the Northwestern Atlantic;
15. Snail Fishery of the Eastern Bering Sea,
16. Atlantic Mackerel Fishery of the Northwestern Atlantic.

These plans contain individual species quotas, a variety of time-area closures, gear restrictions, effort limitations, allowed incidental catch rates, and other measures designed to permit foreign fisheries to take only a designated portion of the optimum sustainable yield. Additionally, these plans minimize the impact of foreign fisheries on stocks especially important to our domestic interests.

On December 23, 1976, an "Invitation for Public Comment on Draft Foreign Fishing Regulations" was published in the Federal Register. These draft regulations were based upon the DEISs that the Secretary had prepared in anticipation of the preparation of PMPs.

The DEISs contain all of the essential elements of PMPs. The regulations include the conditions for issuing permits to foreign fishing vessels, catch quotas, vessel reporting requirements, vessel identification procedures, enforcement procedures, observer acceptance, and reports and recordkeeping.

The allowable surpluses available to foreign nations are listed in the draft regulations by species, ocean area, and quantity available in metric tons. In addition, each fishery is discussed in detail, including species, catch quota or effort limitations, open seasons and areas, closed seasons and areas, gear restrictions, statistical reporting, and incidental catch.

Concurrently with plan development, several other major actions required close cooperation between the Department of State, the U.S. Coast Guard, and the Department of Commerce. As a result:

o Six governing international fishery agreements were signed; others were being negotiated at year's end.

o Foreign permit and permit application forms were developed and transmitted to interested foreign nations.

o A proposed fee schedule was prepared and published in the Federal Register, December 23. It proposed certain charges for foreign fishermen based on vessel size and value of the nation's fishery allocation from the U.S. fishery conservation zone.

o Enforcement and surveillance requirements were assessed, and both short- and long-term strategies developed to ensure compliance with the Act beginning March 1, 1977.

For a more detailed review of NMFS and Council activities during calendar year 1976, refer to the Secretary of Commerce's Annual Report on the FCMA. (See Federal Register 42:13849-13859.)

Efforts of the State/Federal management program to stimulate development of State fishery management plans for Territorial Sea (0 to 3 miles) fisheries include:

o Cooperative State/Federal assessment and economic research of the northern shrimp resource of the Gulf of Maine resulted in closing the fishery in April. The regulation was implemented over a three-State area through the Atlantic States Marine Fisheries Commission.

o Efforts to cooperatively manage the surf clam fishery caused the development of a fishery-wide standard logbook, and closed an area to protect critical clam beds off New Jersey.

o Development of a fishery management plan for the Atlantic menhaden fishery was initiated through voluntary participation of affected State officials and interested industry members by discussions on the plan, scope, costs, and scheduling.

FISHERIES DEVELOPMENT

Fisheries development activities in today's modern technological society include: demonstration fishing, shipboard handling, storage studies, marketing research, inspection service, financial assistance, consumer education, and management planning. The range is from assisting industry to educating consumers about fishery products. The aim is to supply present and future generations with a continued abundance of wholesome, high-quality products from the sea.

What is needed are economic and marketing research; analyses for management, use, and development of the resource; demand/supply projections; benefit/cost studies; foreign trade evaluations; financial assistance through loan guarantees and tax deferrals for construction or rehabilitation of vessels; microbiological, chemical, and technological research into improved use of the resource; voluntary fishery product inspection and certification; improvement of marketing practices and alleviation of short-term supply/demand imbalances; fishery educational services; coordination with industry to increase fish and shellfish supplies from domestic fishery resources.

To function effectively, fisheries development must interrelate with other NMFS activities. It has an important role in determining fishery management and international fishery policies. Research, development, and management are similar to three sides of a triangle: to exist and be fully effective, each requires the other two.

When fisheries development is successful, "resources" are turned into "seafood products." For example, unutilized or underutilized species are promoted to increase their demand and use, and still maintain conservation principles and consumer interests.

INDUSTRY AND CONSUMER SERVICES

These services help industry move seafood from the water to the grocery bag efficiently and economically.

Marketing

Working jointly with industry, NMFS national marketing efforts had the support of the media, retail food chain merchandisers, restaurant chain executives, State dietetic associations, State restaurant associations, professional food educators and professional food users, the Cooperative Extension Service of the U.S. Department of Agriculture, and allied food trade groups. As a result: (1) the consumer has been continuously informed of availability, nutritional value, and wide varieties of uses for fishery products; and (2) the efforts of industry to increase seafood production and make contributions to the economy have been enhanced.

o In April 1976, the Northeast Region sponsored an exhibition of underutilized fishery products at the Milan Samples Fair in Milan, Italy. Fifteen companies displayed 26 different products during the 10-day event. (See figure 8.)

o In fall 1976, all of the commercial trade associations in the Southeast formed a nonprofit corporation for research and development. The Gulf and South Atlantic Fisheries Development Foundation was founded to provide for public and private sector investment in applied research and commercial development projects to more efficiently use the region's marine fishery resources. NMFS staff played a major role forming this organization. NMFS, together with academic, State, and Council interests, will work closely with the new organization in planning its major projects.

Figure 8.-U.S. fishery products on exhibit at the American Food Festival in Tokyo.

Consumer Education

NMFS National Fishery Education Center (NFEC) educates the consumer (from the individual housewife to the chain restaurant buyer) to purchase more and different fishery products. NFEC develops, catalogs, retrieves, and disseminates consumer trade information to Government, industry, trade associations, academia, individual consumers, and consumer advocate groups.

o Drawing on NMFS research and studies, expert advice is made available and disseminated on processing and pollution abatement, contaminants in fishery products, vessel safety and insurance, tariffs and trade, and marketing practices.

o In an expanded consumer education program featuring foods from the sea, the bicentennial theme with its logo--"Fishing--America's First Industry"--was accentuated.

o Seafood recipe booklets from four regions were developed and distributed for use by local groups and organizations.

o The Food Editor Program mailed monthly and seasonal materials to 750 newspapers throughout the United States.

Insurance

Technical assistance for commercial fishing vessel insurance was continued. The legislative approach was emphasized to develop a new protection and indemnity insurance and safety system. Although a Congressional bill, H.R. 9716, was introduced in 1976, no action was taken by Congress.

o A report summarizing the work of an Ad Hoc Group on commercial fishing vessel insurance was completed and distributed.

o A study of operating fishing vessel insurance pools was completed. Study findings will be disseminated to U.S. fishermen to help them understand this system of insuring fishing vessels and fishing personnel.

Trade and Tariffs

o Work continued in cooperation with the Industry Sector Advisory Committee and the Office of International Trade Policy to support multilateral trade negotiations. Concessions from foreign countries on fishery tariffs and other trade barriers of greatest benefit to U.S. fisheries were identified and submitted for consideration. High U.S. tariffs on items that fishermen buy, such as nets and netting, were identified; requests were made to have these tariffs reduced during trade negotiations. Background information and positions were being developed on fishery items in the Tariff Schedule of the United States. In addition, several fishery items proposed for the Generalized System of Preferences were reviewed and positions developed at the request of the Special Representative for Trade.

o Support was given to the International Trade Commission in a Section 201 investigation of the shrimp industry. Subsequently, support was provided the shrimp industry under the trade adjustment assistance program.

Fishery Cooperatives

o Technical assistance was given to clam fishermen to form and operate a new fishery cooperative in Rhode Island. The cooperative was chartered in June 1976, and is operating successfully.

o A survey showed that 103 fishery cooperatives, with memberships in excess of 8,000 fishermen, were in operation in 1976.

Contaminant Program--Product Safety Research

NMFS and the U.S. Department of Agriculture are conducting a nationwide food consumption survey. The results will enable NMFS to obtain statistically reliable estimates of the amounts and species of fish consumed by Americans in their total diet. NMFS also contracted a consumption survey to obtain fish consumption patterns among the "high risk" groups, i.e., heavy users of fish, children, and pregnant women. An improved definition of the relationship between microconstituents levels in fish and consumer intake will aid in addressing possible problems of consumer safety, production, processing, and distribution of fishery products.

Cooperative surveys are underway with the Environmental Protection Agency (EPA) to obtain data on PCB's, 12 chlorinated pesticides, and kepone in important commercial and recreational marine species. These surveys will provide valuable information as to the extent of the microconstituents problem in marine species.

Current Market Analysis

Economic analyses and short-term forecasts of the major fishery products marketed in the United States were published in the Food Fish, Shellfish, and Industrial Fishery Products reports. Monthly surveys of retail prices for fish, meat, and poultry products were made in 10 U.S. cities.

Special Reports and Studies

o A study and publication on "Aspects of the Structure and Market Behavior of the Tanner Crab Industries of the United States and Japan" dealt with foreign influences on the U.S. tanner crab industry that may have disadvantaged U.S. fishermen and processors.

o A study of the New England groundfish industry on the effects of imports, declining catches, and rising prices was done in conjunction with the University of Rhode Island.

o Inflationary impact statements were prepared on the following NMFS actions: (1) ban on catching porpoise incidental to tuna fishing, (2) fees for foreign vessels, and (3) allocation of surplus species.

o An analysis of the impact of shrimp imports on the domestic exvessel price was prepared as background information for an investigation by the International Trade Commission.

o The methodology to determine the level of enforcement necessary under extended jurisdiction as part of an "Enforcement Task Force" was developed.

o A paper on "Domestic Investment in Harvesting and Processing Sectors Required to Utilize Fish Stocks Available Under Extended Jurisdiction" was prepared and presented at the Symposium on Economic Impacts of Extended Jurisdiction at the University of Delaware.

Comprehensive Study of the Oyster Industry

In 1976, a study began on the U.S. oyster industry. Interviews with State and Federal conservation and public health officials, watermen, seafood processors, and marketing personnel were held in seven States. These interviews helped identify the technical, economic, social, political, institutional, and public health issues that concern the growing, harvesting, processing, and marketing of oysters. The findings, conclusions, and recommendations will be part of a report to Congress on the molluscan shellfish industry, as required by the Bauman Amendment to the Coastal Zone Management Act.

SEAFOOD QUALITY AND INSPECTION

The purposes of this service are: (1) provide an impartial seafood inspection and product certification system on a voluntary and reimbursable basis to assist national and international trading in fishery products; (2) provide consumers with quality choices in the marketplace, as well as safety assurances, through protection against contaminated fishery products; (3) help industry upgrade plant sanitation and improve product quality to pass the mandatory inspection of fishery products and plants; (4) educate both consumers and trade to demand and produce safe, wholesome, high-quality seafood products; and (5) provide assistance to the Codex Alimentarius Commission in developing and establishing international standards for foods.

o The amount of edible fishery products inspected increased from 623 million pounds in 1975 to over 809 million pounds in 1976, or 41 percent of the fishery products processed in the United States. Sixty-eight plants were under contract inspection by year's end, or 4 percent of the processing facilities in the United States.

The increased use of the inspection program by industry in 1976 was attributed to improved program management, the creation of new services, and increased consumer and trade education on inspected products. As a result, the voluntary fee-for-service Seafood Inspection Program became fully self-supporting.

o Developmental research on color standards for minced fish blocks was completed. A provision for these standards will be incorporated in new interim quality standards for minced fish blocks.

o Agreements were signed with Tennessee and Arkansas that permit State inspectors to inspect and certify fishery products according to U.S. Department of Commerce (USDC) requirements. These agreements extend USDC inspection services without additional Federal personnel.

o Research to develop a new system for market names of fish and fishery products was continued. A new contract to develop a prototype model-naming system based upon product edibility factors was issued.

o Two comprehensive advisory codes of technological and hygienic practice for fresh and canned fish were completed through the International Food Standards Program. These will be distributed to the U.S. industry as guidance for improving product handling practices.

FINANCIAL ASSISTANCE

Three active financial assistance programs were administered; existing cases were serviced for two inactive ones. The active programs were: (1) Fishing Vessel Obligation Guarantee Program (a loan guarantee program for fishing vessel construction or major refurbishing); (2) Fishing Vessel Capital Construction Fund (a tax deferral program designed to accelerate capital accumulation for vessel construction or major refurbishing); and (3) Fisherman's Guaranty Fund (a program to indemnify fishermen for certain losses owing to seizure on the high seas). The inactive programs were the Fisheries Loan Fund and the Fishing Subsidy Program.

o The guarantee program received applications for $19.8 million in 1976. Applications worth $11.3 million were approved. This guarantee program during the year was made self-financing; all administrative expenses were paid by fees generated from program operations. The program is expanding and providing access to the capital market for fishing vessel owners to obtain long-term loans at a reasonable cost.

o Participation in the tax deferral program also continued to increase, allowing fishermen to internally generate a greater portion of their capital needs for vessel construction or refurbishing. There are presently 618 active agreement holders who have deposited $80 million into individual tax deferred accounts reserved for eligible vessel projects. Of these, 126 were new participants during the year, with 1976 tax deferred deposits

of $16.2 million. Vessel projects costing $350 million have been, or are scheduled over the next 10 years to be, assisted with tax deferred deposits under this program. To date, withdrawals to accomplish these projects is $56 million.

o The seizure indemnification program paid $196,711 in claims to the owners and crew of seven vessels, seized in 1975 off the coast of Ecuador. Total claim payments to date from those seizures are $2,017,648.

One of the inactive financial assistance programs--the Fisheries Loan Fund--has been under administrative moratorium since 1973. In addition to completing a draft bill proposing to modify and reactivate this program, the Department of Commerce contends that this program should be relegislated and used to encourage the development of underutilized U.S. fisheries and the improvement of productivity aboard fishing vessels.

MARINE RESOURCES MONITORING ASSESSMENT AND PREDICTION PROGRAM(MARMAP)

MARMAP's mission is to continually assess the Nation's living marine resources. It has four components: (1) Resource Surveys--uses eight NOAA ships plus chartered vessels to sample the abundance of fish and shellfish in their egg, larval, juvenile, and adult stages by area and by season; (2) Fishery Engineering--applies advanced technology for collecting resource information and to ensure the rapid collection and processing of data; (3) Fishery Oceanography--defines the influence of natural environmental factors on the distribution and abundance of living marine resources; and (4) Fishery Analysis--takes the data from resource surveys, fishery oceanography, commercial and recreational fisheries to construct yield curves and mathematical population models, and to make forecasts and status-of-stock reports to support management decisions and plans.

o In 1976, MARMAP was a valuable nationally coordinated program. It provided the assessment information critical to the preparation of 16 Preliminary Management Plans and one Regional Council Management Plan as required by the Fishery Conservation and Management Act of 1976.

NORTHEAST

o Resource assessment work in the Northwest Atlantic included surveys of: offshore bottom fishes from Nova Scotia to Cape Hatteras; inshore bottom fishes in Sandy Hook, Raritan, Massachusetts, and Cape Cod Bays; surf clams; New Jersey summer fish kill; Argo Merchant oil spill; and offshore bottom and mid-water fishes in cooperation with five foreign nations. Additional resource assessment work focused on age and growth studies, statistics, recreational fisheries, and gear research. (See figure 9.)

o The ages of over 25,000 fish of 12 species were determined. To improve the system a contract was granted to develop an automatic age reader. Statisticians refined New England commercial fisheries data to evaluate the impact of offshore energy development on the fisheries resources and to make better stock assessments for fisheries managers. Recreational fisheries scientists censused the catch and effort of party and charter boat anglers. Gear researchers completed a 4-year program to develop a standard groundfish survey bottom trawl for the Northwest Atlantic, and advanced our knowledge of hydroacoustical survey methods through a joint U.S.-U.S.S.R. study on the Soviet research vessel Khronometer off northwestern Africa.

Studies of the physical and chemical environment dealt principally with climatic conditions surrounding the New Jersey summer fish kill, the relationship between tuna distribution off western Africa and dissolved oxygen distribution, and the effects of some Gulf Stream eddies on New England fisheries. Oceanographers also installed nine current meters across the Northeast Channel between Browns and Georges Banks to monitor any deep flow between the Gulf of Maine and the Atlantic Ocean.

o Plankton ecology and ichthyoplankton investigations developed a density-based system for automatically sorting plankton. Studies on the relationships between the production of larval fish and the production of their food have shown that the survival of Atlantic herring larvae in the coastal waters of the Gulf of Maine depends on the successful reproduction of a single copepod species. Scientists are now looking at this copepod's role in larval survival on the offshore spawning grounds in the Gulf. In addition, both investigations significantly contributed to making operational the joint American-Polish Plankton Sorting and Identification Center in Szczecin, Poland. The center, one of the largest in the world, provides rapid and reliable data on abundance of food for commercially important fishes

Figure 9.-Northeast Fisheries Center scientists photographed this blue hake--an abundant but little understood fish of the Northeast's Continental Slope.

in the Northwest Atlantic, and on changes in the zooplankton populations of Georges Bank, Gulf of Maine, and Mid-Atlantic Bight.

SOUTH ATLANTIC and GULF

o Resource assessment surveys were made by the Miami (Fla.) Laboratory off Cape Canaveral and Apalachicola for calico scallops; and information on scallop concentrations was given to industry.

o A complete faunal survey using dredges was made from Cape Canaveral south to Ft. Pierce in 10 to 30 fathoms. These data will be used as a baseline year for future annual comparisons.

o Resource assessment surveys of industrial groundfish stocks by the Pascagoula (Miss.) Laboratory have developed information concerning age and growth, spatial and temporal distribution, and relative abundance, spawning, and recruitment. Associated studies of the shrimp fleet discards of groundfish provide valuable insight into the total biomass of these stocks.

o Menhaden research at the Beaufort (N.C.) Laboratory intensified as a result of the need for management, for constant communication with the industry and States, and for increased capability to assimilate and analyze data. Major analytical efforts include an appraisal of Gulf menhaden population dynamics, an analysis of the impact of environmental factors on the abundance of Atlantic menhaden year-classes, and assessment of the yield per recruit of Atlantic menhaden at different levels of fishing effort. For the first time, management groups for both fisheries were formed. Both groups include NMFS, States, and fishing industry representatives.

o A study of procedures for development of bio-socio-economic models of the U.S. Gulf coast shrimping industry for use in resource management was completed by a contract with the U.S. Army Corps of Engineers. The report outlines fishery production functions, their relationships to econometric models, and recommendations for further study to develop bio-socio-economic models required to determine optimum yield in the Gulf shrimp fishery.

As part of an ongoing menhaden and thread herring investigation using the LANDSAT satellite, the National Fisheries Engineering Laboratory (NFEL) conducted

an operational system simulation on July 19-20. The premise was that satellite-acquired data could be processed, interpreted, and used to predict high-probability fishing areas within a 24-hour period. The satellite passed over the area at 10:25 c.d.t., and charts (fig. 10) were prepared and distributed to industry personnel by 7:15 a.m. the following morning. The commercial fleet reported that fish were concentrated in the high probability areas indicated by the analysis of the satellite data, and that they were having one of the best days of the season to date.

SOUTHWEST

The La Jolla (Calif.) Laboratory reports increased use of information derived from larval fish studies in establishing criteria for the management of pelagic fish species. Biomass estimates of northern anchovy derived from fish egg and larva data are still the prime sources of data used to monitor the U.S. and Mexican stocks of the northern anchovy (fig. 11). The most recent plan presented to the Fish and Game Commission of the State of California to manage the commercial anchovy fishery was derived from larval abundance estimates produced at the La Jolla Laboratory. The California Department of Fish and Game has relied heavily on the time series of larval abundance to indicate fluctuations in the major anchovy population.

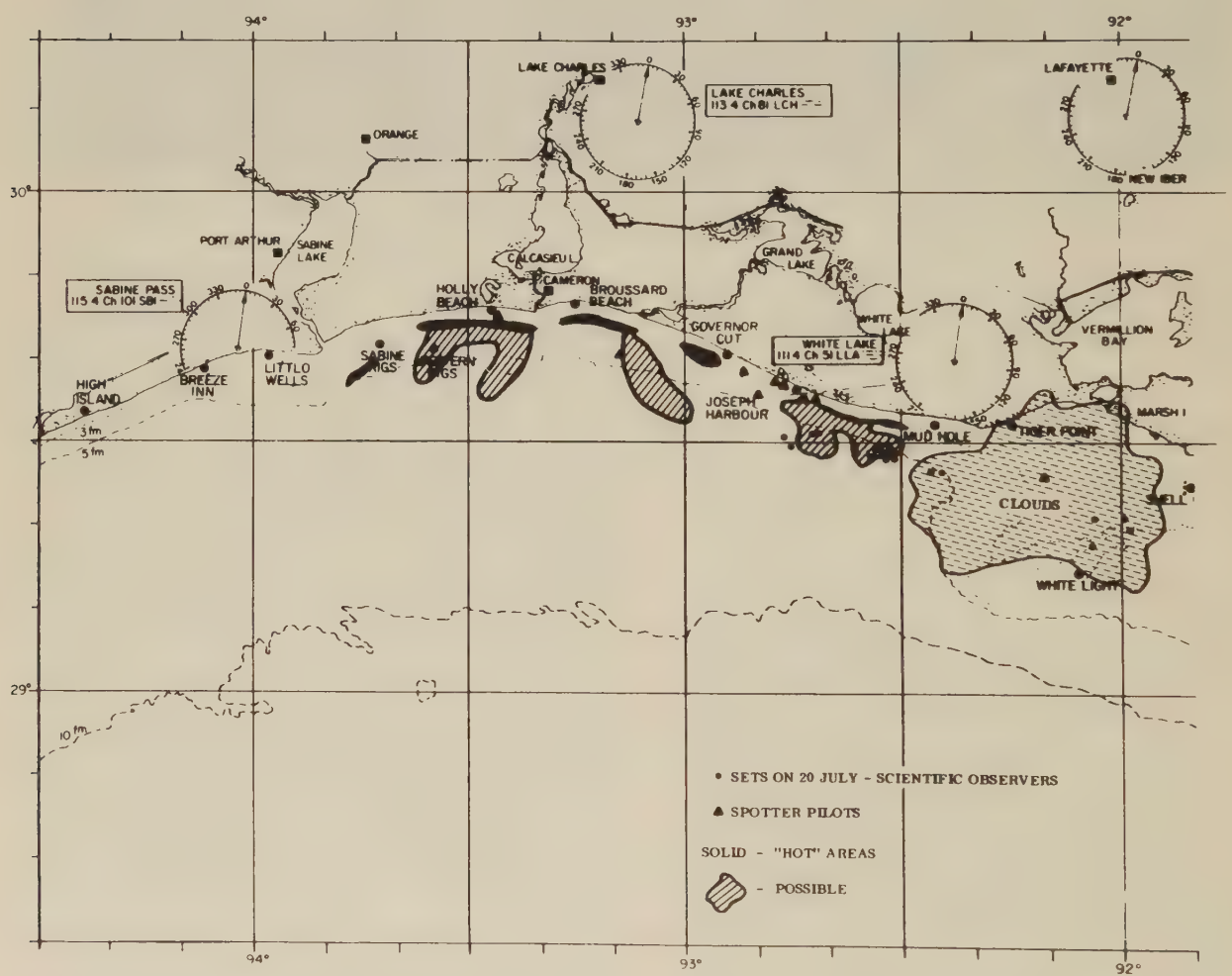

Figure 10.-Predicted high probability fishing areas for July 20, 1976, using July 19, 1976, LANDSAT MSS data.

Figure 11.-Plankton collected with standard plankton net during a California Cooperative Oceanic Fisheries Investigations Survey. Fish eggs and larvae will be sorted from this sample as part of the Southwest Fisheries Center's pelagic fish biomass studies.

The causes of larval fish mortality and its effect on recruitment have become increasingly important areas of study to understand how pelagic fish larvae cope with their environment. A recent scientific publication from NMFS Southwest Fisheries Center (SWFC) describes the relationship between oceanographic conditions and larval anchovy food in the California current. It supports the hypothesis that upwelling events and storms in the California current are detrimental to anchovy larvae by diluting concentrations of their food. Through a fishery analysis, the California Department of Fish and Game predicted that the 1975 year-class of anchovy would be a poor one. This was based on the massive upwelling in the Los Angeles Bight during the anchovy spawning season and the poor nutritional content of the dominant larval fish food organism present before upwelling occurred.

o The continuing cooperative field studies with the American Fishermen's Research Foundation on the Pacific Coast albacore fishery included intensive oceanographic sampling and scouting by chartered commercial vessels in the western Pacific, an extensive tagging effort, and studies of within-season fish movements and post-season emigration. This joint research yielded considerable new knowledge about the North Pacific albacore resource; the fish off North America apparently represent two independent and geographically separate groups, and appear to have different migration patterns. Fish in the Pacific Northwest fishery make trans-Pacific migrations, with exchanges taking place between the United States fishery and the Japanese live-bait fishery. Fish in the California fishery apparently make shorter migrations, presumably to Central Pacific waters, and do not appear to enter the Japanese live-bait fishery.

A growing interest in the resources of the relatively untouched Northwestern Hawaiian Islands (NWHI) caused NMFS' Honolulu Laboratory to plan to gather ecological information from which to formulate management decisions on long-range use of aquatic resources and protection of the aquatic and terrestrial resources of these islands. Because of overlapping jurisdictions, a Tripartite Cooperative Agreement between NMFS, the U.S. Fish and Wildlife Service, and the State of Hawaii is being negotiated to survey and assess the biological resources of the NWHI. The Honolulu Laboratory will assume the lead role in implementing the agreement, and will survey and assess the insular, seamount, and pelagic and other fish resources of the area.

o The structure of a tuna computer data base for worldwide coverage was completed during 1976 at the La Jolla Laboratory. Data from the base were used to assess the condition of the Atlantic yellowfin, bigeye, and skipjack tuna resources. Results indicated that the Atlantic yellowfin and bigeye tuna resources are approaching full exploitation. However, the skipjack tuna resource is probably not yet fully utilized, despite poor availability in the past two years.

At the Pacific Environmental Group in Monterey (Calif.), marine meteorological properties are being used to develop indices of changing ocean conditions that affect fishery resources. Upwelling and the offshore divergence indices have been used in a multiple regression model that describes recruitment in the California stock of Pacific mackerel (Scomber japonicus). For the years 1946 - 1968, these environmental parameters account for the 76 percent variation in the recruitment of this stock. This is the first time that environmental factors have played a major role in a simulation model for managing an important fishery resource.

NORTHWEST and ALASKA

Plans for a cooperative rockfish survey between northern British Columbia, Canada, and Monterey Bay, Calif., were

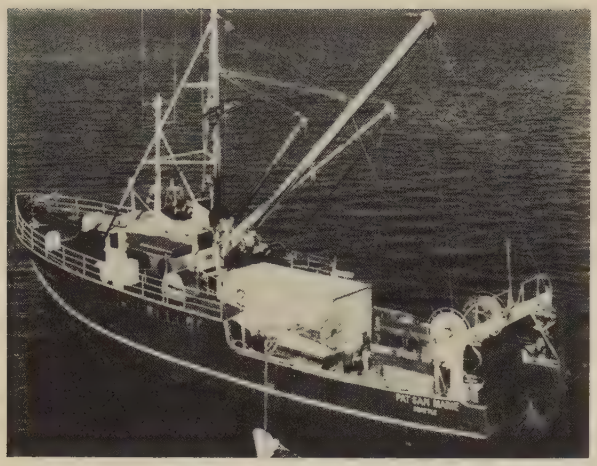

Figure 12.-Because significant quantities of rockfish occur in midwater where they are unavailable to demersal trawls, a hydroacoustic/midwater trawl survey was coupled with a bottom trawl survey. Use of bottom trawls provided information on flatfish and other bottom-dwelling species. This chartered commercial trawler used the Northwest and Alaska Fisheries Center's recently developed van-contained computerized echo-sounder data acquisition and processing system.

completed and field operations began. These operations, performed in August and September, involved personnel and vessels from State fishery agencies of California, Oregon, and Washington; NMFS; and the Fisheries and Marine Service of Canada. Significant quantities of rockfish occur in midwater regions where they are unavailable to demersal trawls; for this reason, a hydroacoustic/midwater trawl survey was coupled with a bottom trawl survey. Bottom trawls provided information on flatfish and other bottom dwelling species.

A hydroacoustic survey was conducted from a chartered commercial trawler (fig. 12) using the Northwest and Alaska Fisheries Center's (NWAFC) recently developed,van-contained, computerized echo-sounder data acquisition and processing system. Operation of the computer, peripheral devices, software, and the new dual-beam system was essentially trouble-free.

Biomass estimates from the bottom trawl survey indicated that splitnose rockfish, Pacific sand dab, and Dover sole were the predominant species in the Monterey area, Pacific ocean perch and arrowtooth flounder were the most abundant in Queen Charlotte Sound.

Preliminary analysis of midwater trawling data shows that extensive concentrations of shortbelly and yellowtail rockfish occur in midwater; it also indicates that the demersal trawl survey significantly underestimates the biomass of these species.

Fishery oceanography activities centered on developing an eight-component, four-dimensional Dynamic Numerical Marine Ecosystem Model (DYNUMES) of the Bering Sea, programmed to show how ecosystem models help solve complex fisheries management problems. This model was used to study the effects of the fishery on the pollock biomass and the interactions between the pollock and herring biomasses. The DYNUMES model will be expanded to include all major ecological groups (20 components), and will investigate the effects of environmental anomalies on the behavior and abundance of fishery resources.

o NMFS, in cooperation with the State of Alaska Department of Fish and Game, surveyed wintering stocks of herring from Lynn Canal in northern Southeastern Alaska to the bays and inlets of the west coast of southern Southeastern Alaska (fig. 13). This information will (1) determine the areas of concentrations of wintering herring as a basis for overall population estimates, and (2) help assess the potential impact on herring of forming log-dumping and rafting areas in various bays and inlets.

o As part of NMFS research activities to provide the information base necessary for determining utilization of Bering Sea fishery resources under the new 200-mile extended jurisdiction, the Seattle (Wash.) Laboratory, during the spring, conducted a second multivessel MARMAP survey of the demersal fishes and invertebrates inhabiting this area. These baseline trawl surveys have shown the dynamic nature of the species

Figure 13.-With the aid of a hydraulic net puller, Alaska fishermen pull net during Alaska's first herring gill net fishery at Kah-Shakes Bay in 1976.

make-up of the eastern Bering Sea community and their environmental habitat. Because of changes in the bottom water temperature, this survey showed dramatic changes in the late winter-early spring geographic distribution of the major fish populations from those observed during the summer-fall period. The southern stock of yellowfin sole was concentrated in the southeast corner of the Bering Sea, north of Unimak Island at depths from 75 to 150 meters; the northern stock was most abundant in the vicinity of the Pribilof Islands out to 250 meters. The rock sole population, which was broken up into several stocks, was encountered in the same general area, but at deeper depths.

Pacific halibut was concentrated in the deeper, warmer water along the upper Continental Slope from 200 to 500 meters. Herring, on the other hand, was found along the ice edge in the central Bering Sea.

o The Auke Bay (Alaska) Laboratory played a leading role in implementing a logbook research program initiated by the Ketchikan Alaska Trollers Association. During the first season of operation, about 100 fishermen participated in the program and recorded data on fishing positions, catch, water temperature, as well as observations of forage fishes and other marine life. The program is designed primarily to give the troll fleet a comprehensive data base that correlates catch statistics and environmental conditions.

o Fishery analysis activities by NMFS scientists concluded that the pollock resource, comprising 85 percent of the groundfish landings by foreign fleets from the eastern Bering Sea, has continued to decline in abundance. Rockfish, sablefish, and herring populations remain in a depleted state. In contrast to these stocks, the yellowfin sole resource has shown signs of recovery from its previously depleted condition. There appears to have been little change in the abundance of Pacific cod, rock sole, flathead sole, and Greenland turbot stocks in recent years. These conclusions are based on the results of comprehensive MARMAP surveys, data collected by NMFS observers aboard foreign fishing vessels, and analysis of foreign fisheries catch statistics.

o An analysis of the operations of the Japanese mothership salmon fishery estimated that 0.9 million fish, or 7 percent of the total runs, have been intercepted by that fishery from the 1976 run of Bristol Bay sockeye salmon. Both figures are substantially below the average of previous years.

DATA MANAGEMENT, STATISTICS, AND MARKET NEWS

New statistical programs are needed to generate data to manage and conserve the fisheries in the Fishery Conservation Zone created by the Fishery Conservation and Management Act of 1976 (Public Law 94-265). Moreover, present statistical programs must be maintained to meet requirements set forth in the Act and the prospect of increased domestic fishing in the Zone.

New data management centers, each located at one of the four principal NMFS Fisheries Centers, are responsible for managing fisheries data. The activities of the four regional data management centers will be coordinated by a National Data Management Committee. This Committee will also develop national standards for fishery statistics and data management. The Committee, chaired by the Chief of the Data Management and Statistics Division of the Central Office of NMFS in Washington, D.C., has selected members from the four regional data management centers and from NOAA's Environmental Data Service.

o As a first step, the National Data Management Committee prepared a feasibility study outlining current and future NMFS requirements for data processing, including computer capacity and telecommunication links. The Department of Commerce has approved the study, and the four Fisheries Centers have started to expand their data processing capabilities.

NMFS' fishery statistical programs include: (1) marine recreational fisheries, (2) commercial marine and inland fisheries, and (3) fishery market news.

The Marine Recreational Fisheries Statistics Program reviewed data collected in pilot surveys of the Atlantic and Gulf States using telephone interviews and and mail questionnaires. Based on the results of these surveys, a study was contracted to develop methodologies to correct deficiencies revealed in survey designs used in the pilot surveys. The contractor also was requested to recommend the most cost-efficient methodology for collecting marine recreational statistics. Future surveys implementing results of this study will obtain catch and participation data. The first of these surveys will be conducted in California, Oregon, Idaho, and Washington; and if

funding allows, in Alaska and Hawaii.

o In 1976, about 250 statistical reports were issued on marine and inland commercial fisheries statistics in Current Fisheries Statistics (C.F.S.). These reports covered domestic commercial landings of fish and shellfish, domestic production of processed fishery products, freezings and cold storage holdings, and imports and exports of fishery products.

o Fishery Market News Reports were published three times a week at Boston, Mass., New York, N.Y., New Orleans, La., Terminal Island, Calif., and Seattle, Wash. Subscriptions to these reports, placed on sale in 1975, were about 5,000 in 1976.

During the year the Fishery Market News Offices studied what changes should be made in the reports. Because of a lack of subscriber interest, some price series data were dropped, but increased interest by subscribers resulted in more coverage of foreign fishing and imports of fishery products. More space was also given in the Reports to information taken from "Market Review and Outlook" reports. Automatic telephone service with prerecorded current fishery market information was continued in five ports on the Atlantic coast and in Chicago.

INTERNATIONAL ASPECTS OF FISHERIES

Important NMFS functions are preparing international negotiations on fisheries and marine mammal issues (in cooperation with the U.S. Department of State), including writing position and background papers. Also, advising the chairmen of the U.S. delegations, and implementing international policy concerning living marine resources.

In 1976, the United States was a member of eight international fisheries commissions, responsible under treaty agreements to conserve and manage living marine resources of interest to the United States. In most cases, NMFS has had primary responsibilities for making scientific and technical assessments and investigations to determine the international measures needed to protect living marine resources. In addition, various NMFS officials have been appointed to serve as U.S. spokesmen in bilateral negotiations or as commissioners on several of the international fisheries commissions.

Enactment of the Fishery Conservation and Management Act of 1976 extending the fisheries jurisdiction of the United States established important new responsibilities and directives in international negotiations. The Act provides for negotiating governing international fishery agreements for those countries applying to fish for resources under the exclusive fishery management authority of the United States. These countries must acknowledge the exclusive U.S. fishery management authority as set forth in the Act. The Act also calls for the Secretary of State, in cooperation with the Secretary of Commerce: (1) to renegotiate any treaty pertaining to fishing for resources subject to the exclusive fishery management authority of the United States, if such renegotiation is necessary to conform such treaties to the purposes, policies, and provisions of the Act; (2) to conduct negotiations for the purpose of entering into international fishery agreements: "(A) which allow fishing vessels of the United States equitable access to fish over which foreign nations assert exclusive fishery management authority, and (B) which provide for the conservation and management of anadromous species and highly migratory species;" and (3) to conduct negotiations to establish the boundaries of the fishery conservation zone of the United States in relation to other nations.

Accomplishments

o Negotiations were started that led to the signing, prior to March 1, 1977, when the extension of U.S. fisheries jurisdiction became effective, of governing international fisheries agreements with Poland, Romania, Spain, Bulgaria, the Republic of Korea, the German Democratic Republic, the Republic of China, Japan, the U.S.S.R., and the European Economic Community. The parties to these agreements include the principal countries that had been fishing off U.S. coasts.

o Review of treaties pertaining to fisheries resources was started in 1976. This led to the United States withdrawal on December 31, 1976, from the International Convention for the Northwest Atlantic Fisheries, under which the International Commission for the Northwest Atlantic Fisheries (ICNAF) had been established in 1951 to manage fisheries resources in the North Atlantic off the United States and Canada. Prior to its withdrawal, the United States participated in annual and special meetings of ICNAF during 1976 which helped prepare for the transition to U.S. management of its coastal fishery resources. The future of

the International Convention for the High Seas Fisheries of the North Pacific Ocean in view of extended jurisdiction was discussed among the parties at the November 1976 annual meeting of the Commission created by the Convention. It was agreed that the matter would be referred to the respective governments of the parties for further consideration. Under its terms, the Convention will terminate for all parties one year from the date when notice is given by any one party of an intent to terminate the Convention.

o There were a series of U.S.-Canadian consultations regarding fisheries and maritime boundaries after fisheries jurisdictional extensions by both countries. These consultations, which continued into 1977, resulted in the signing on February 24, 1977, of a Reciprocal Fisheries Agreement (subject to approval by the U.S. Congress) to permit continuation of fishing by fishermen of each country off the coasts of the other for 1977. It was recognized that certain issues of long-term significance related to both fisheries and boundaries would need to be further studied and discussed by both countries.

o After three rounds of fisheries negotiations held in 1976, the United States and Mexico signed an agreement on November 24, providing arrangements for U.S. vessels to continue fishing in the Mexican 200-mile economic zone. The agreement authorizes: (1) U.S. fishermen limited access to traditional fisheries within 12 miles of the west coast of Mexico; (2) U.S. vessels to harvest surplus portions of the total allowable catch, determined by Mexico, of snapper and grouper, shrimp, and associated incidental fishes within the 12- to 200-mile zone off Mexico's Gulf coast; and (3) continuation of the U.S. fishery in the 12- to 200-mile zone for highly migratory species without prejudicing the juridical position of the United States in the Law of the Sea Conference.

o Conservation of the world's whales was significantly advanced at the 28th Meeting of the International Whaling Commission (IWC), June 1976. New quotas established show a reduction of 6,000 animals from the previous quotas of 32,000 animals. This reduction is particularly meaningful because it allowed for taking fewer of the largest whales such as sperm, fin, sei, and Bryde's whales. The new quota levels are the lowest in the history of IWC, and are consistent with the new management procedures adopted at the 1975 IWC meeting. These measures are expected to restore depleted whale species and to forestall depletion of whale species presently under exploitation.

o The four parties (Canada, Japan, the United States, and the U.S.S.R.) to the Interim Convention on the Conservation of North Pacific Fur Seals ratified a Protocol in October 1976 to amend the Convention, extending it for another four years. The Protocol includes a pledge by all parties to ensure humane harvesting, and a provision allowing for a supply of fur seal meat for Native subsistence needs.

o Agreement was reached in the Inter-American Tropical Tuna Commission (IATTC) concerning the yellowfin tuna regulatory program in the eastern tropical Pacific for the 1977 fishing year. The IATTC catch quota for yellowfin will remain at 175,000 tons with allowances for two additional increments up to a maximum quota of 210,000 should data from the fishery warrant such increases. With regard to the tuna/porpoise problem, the Commission requested a comprehensive technical review of all existing information pertaining to the problem and the preparation of a detailed proposal for Commission porpoise research. The member countries agreed to support, in general, the following resolution proposed by the United States:

(1) reconvene no later than June 1977 to consider the proposal;
(2) support, in principle, a guest scientist program; and
(3) collect data related to the porpoise mortality problem.

o Information on the latest developments in world fisheries was collected, evaluated, and disseminated. NMFS received and used data from commercial and economic officers of U.S. embassies; the four Regional Fishery Attaches; foreign fishery ministries and agencies; and foreign fishery publications and trade journals. Nearly 4,000 cables and airgrams from U.S. diplomatic posts were received; 3,250 were processed and analyzed.

o Current information on major developments in the fisheries of foreign countries, especially as they affect the U.S. domestic industry or U.S. Government policies and programs, was collected and evaluated. Background information, needed in determining U.S. policy concerning high-seas resource conservation and management, international trade in fishery products, intergovernmental development programs,

was evaluated and supplied. Detailed surveys of Madagascar, Denmark, Peru, and Mauritania fisheries were published. Detailed background reports on the fisheries of Mexico, Cuba, Angola, and Korea were prepared for use in international fisheries negotiations.

o A total of 277 International Fisheries Reports, on the economic, technological, and political developments in the world's fisheries were prepared and disseminated to U.S. Government and private industry sources.

o An analysis of the spiny lobster fisheries of Latin America was begun in 1976. A number of U.S. companies have had difficulties obtaining adequate supplies of spiny lobster, because of the withdrawal of U.S. fishermen from the Bahamas. Reports on the spiny lobster fisheries of the Bahamas, Costa Rica, Chile, Ecuador, Guatemala, Haiti, Honduras, Jamaica, and Peru, were published in 1976. Research on the remaining countries was nearing completion by year's end.

o NMFS worked closely with the U.S. fishing industry and other interested parties on problems relating to foreign fishery operations in order to develop and stimulate U.S. fishery exports. Detailed lists of foreign importing companies have been compiled to help U.S. fishery interests export their products.

o Because of the increased interest in joint ventures, a file of foreign and U.S. companies interested in joint ventures has been established. U.S. companies, expressing an interest in joint venture partnerships, are informed of investment opportunities as they occur.

o Fishery reporting requirements of the Department of State were revised. Appraisals were prepared of cables received from U.S. overseas embassies and consulates. Foreign fishery publications and analytical reports on foreign fishing industries were obtained and filed.

o NMFS organized a national clearinghouse for translated foreign fisheries, oceanographic, and atmospheric literature. This included screening and examining foreign ocean science and fisheries books, journals, newspapers, and other publications and arranging for translations in-house as well as in Poland, Tunisia, India, Pakistan, and the United Arab Republic. Material translated overseas is financed by Public Law 83-480, Special Foreign Currencies. Three releases are published regularly to inform users of new foreign literature and current translations:

1. Received or Planned Current Foreign Fisheries, Oceanographic, and Atmospheric Translations;

2. Translated Tables of Contents of Current Foreign Fisheries, Oceanographic, and Atmospheric Publications;

3. Survey of Foreign Fisheries, Oceanographic, and Atmospheric Literature.

Extensive exchanges of translations and publications are maintained with many leading national and foreign institutions and organizations. About 32,000 translations were distributed in 1976 to government, industry, international organizations, and academic circles. Notable translations produced in 1976 included: "Fishing Atlas of the Northwest African Shelf," by A. Klimaj; "Electrical Fishing--Theory and Practice," by V. G. Sternin et al; and "Selected Works on Fishing Gear," Vols. 1 and 2, by F. I. Baranov.

INTERNATIONAL CLAIMS BOARDS

The U.S.-U.S.S.R. Fisheries Claims Board reported four claims were filed in 1976 by U.S. fishermen alleging Soviet responsibility for losses of fixed gear. The Board considered 40 claims during the year: 33 claims were active carryovers from 1975, 4 were new claims filed in 1976, and 3 were claims reinstated at the claimant's request when judicial proceedings in U.S. Federal Court were dismissed without cost to either party. Settlements favorable to the claimant were recommended in 16 claims, totaling $105,894.96. For 17 claims, the Board determined that the record did not support findings that Soviet fishing vessels were liable for the alleged losses. The Board also determined that the two claims had been submitted beyond the filing period under the Agreement establishing the Board and thus, it was unable to consider them. At the close of 1976, five claims remained under active consideration. Settlements recommended by the Board since its existence, as of January 1, 1977, are $205,910.01. Compensation has been tendered in all cases in accordance with the Board's recommendations.

The United States-Polish Fisheries Claims Board as of January 1, 1977, examined eight allegations of loss or damage to U.S. fishing vessels or gear in which Polish vessels were named as respondents. The Board made recommendations in six of these cases. In four cases, the Board made recommendations favorable to the claimant for $10,500.00. In two cases, the Board found that the evidence submitted was insufficient to reasonably establish Polish responsibility for the alleged losses. The Board was unable to consider two claims because the incidents causing them occurred prior to the period that the Board may consider. Pursuant to the Agreement establishing the Board, and at the request of the Government of the Polish People's Republic, the Board also considered a question concerning the application of a bilateral fisheries agreement in force between the two countries. At the close of 1976, the Board had completed all its outstanding matters. Compensation was tendered in all cases in accordance with the Board's recommendations.

MARINE RECREATIONAL FISHERIES

The Office of Marine Recreational Fisheries prepares program plans, provides program direction, and recommends national policy to the Director.

The Regional Offices and Research Centers--within national policy guidelines--monitor, execute, and refine programs. They work together to provide information, analyses, and recommendations to management.

NORTHWEST REGION

o Three research projects were started to identify non-salmonid species in Puget Sound with high recreational potentials and to chart their distribution, abundance, and availability to recreational fishermen. Sampling from small research vessels yielded 1,100 fishes, representing seven families, and a variety of catch/effort, distributional, and biological data. Additionally, biologists interviewed and checked the catches of over 300 boat anglers and skin divers. A tag-recapture effort released 454 tagged rockfish (Sebastes spp.). There have been 14 returns to data, and a number of fish were held and observed to determine tag retention and mortality. This project is timely because recent Federal court decisions have curtailed the allocation of salmon to non-Indian commercial and sport fishermen, thus forcing increased recreational pressure on species previously only slightly utilized.

o Research to estimate net economic values associated with recreational steelhead trout fishing in the State of Washington was continued. The results of this project, which will be completed during fiscal year 1977, will also evaluate economic and social benefits, and estimate the effect of changes in fishing quality on net benefits.

o Special meetings were held with representatives of recreational fishermen's groups. Twenty-four programs were presented by NMFS personnel at recreational fishery organizations' meetings.

SOUTHWEST REGION

o Tag returns showed that some of the 30,000 young silver salmon reared at the Southwest Fisheries Center's (SWFC) Tiburon Laboratory in saltwater holding pens and released in November 1975, returned to San Francisco Bay in 1976. No natural silver salmon runs occur in San Francisco Bay, and it is assumed that all of the silver salmon caught in the Bay were reared in the Tiburon Laboratory. Sixty-one tags were returned; from August through November 1976, many salmon were seen daily, jumping in great numbers in a 2-mile area around the Laboratory's pen-rearing site. The fish which showed up inside the Bay had grown to an average size of about 4 pounds (average size at release was about 1/4 pound).

o An additional brood of king salmon was reared at Tiburon in fall 1976; 4,250 fish were released in December.

o A southern California kelp bed community study was the subject of a major scientific article ("Trophic Interactions Among Fishes and Zooplankters Nearshore at Santa Catalina Island, California," Fish. Bull. Vol. 74: 567-598). It describes the interrelationships among kelp bed fishes and nearshore zooplankton at Santa Catalina Island (off the southern California mainland). Attention has now shifted to the next phase of the study, investigation of nearshore recreational fishes of northern California, where different species characterize the cold-temperate zone extending northward to Alaska as opposed to the warm-temperate zone of southern California.

o A book, Anglers' Guide to the United States Pacific Coast, went to press in 1976 and will be available at nominal cost

to the public from the Government Printing Office. It is a comprehensive report of marine recreational fishing locations along the coasts of California, Oregon, Washington, Alaska, Hawaii, American Samoa, and Guam. Saltwater anglers will find that the 40 fishing charts outline fishing grounds and pinpoint angler facilities. Also included are illustrated descriptions of over 200 major marine game fishes of the areas in the Guide.

SOUTHEAST REGION

o Catch and effort of headboat anglers fishing snappers, groupers, porgies, grunts, and other offshore reef fishes were monitored. These fishes are the focus of a large recreational and developing commercial fishery. The data collected are used to develop life histories and population dynamics of fish in the reef community, and to measure the stocks on selected reefs by tagging, tag recovery, and diving observations. Life history research, including studies of foods, reproduction, growth and mortality, and construction of yield per recruit models, is wholly or partially complete for these species: red porgy, vermillion snapper, red snapper, gag, and white grunt.

o A Program Development Plan and a Program Emphasis Document were developed for the marine recreational fisheries of the Southeast Region. These are presently being combined with similar documents from the other Regions into a National Plan for Marine Recreational Fisheries.

o Research continued on the biology, ecology, and population dynamics of billfish stocks in the South Atlantic and Gulf. Data were recorded from big-game fishing tournaments and an additional 8,000 hours of data were obtained from port sampling. The cooperative Woods Hole Oceanographic Institution-NMFS tagging program resulted in two unusual tag returns--one from a blue marlin tagged in the Western Atlantic and recaptured in the Gulf of Guinea, the other from a giant bluefin tuna that carried a tag for ten years.

NORTHEAST REGION

o Information on distribution, abundance, and environmental preferences of sea basses from North Carolina to Florida was compiled. Researchers separated northern and southern stocks of spot using statistical analysis of morphometric and meristic characteristics. Using this same technique, they defined northern and southern racial groups of summer flounder between New York and Florida.

o The final four volumes of The Anglers' Guide to the United States Atlantic Coast were completed and are now available from the Government Printing Office.[2/]

o Tagging studies of sharks and other large pelagic game fish in the Atlantic continued. The purpose is to determine their distribution and abundance. There were 76 tag returns from captured fish in 1976 (included 13 species of sharks, a tuna, and an amberjack). This was a record number of recaptures--more than half were sent in by sport fishermen.

o A blue shark tagged six years earlier was recaptured by a Japanese longline vessel. To date, this is the longest time-at-liberty for any blue shark recapture. A sandbar shark recovery holds the record for time-at-liberty. Ten years and 45 days after it was tagged off Edisto Beach, South Carolina, it was recaptured at Jacksonville, Florida.

TUNA-PORPOISE PROBLEM

Public concern over porpoise deaths incidental to yellowfin tuna purse seining grew significantly in 1976 and resulted in various responses in the courts, Congress, Government, and industry. These actions were in response to 1976 regulations and proposed regulations for the 1977 season.

In announcing 1976 regulations, NMFS indicated that a quota on the incidental kill of porpoise during yellowfin tuna purse seining would be imposed if the United States 1976 kill for the January to April 14 period was not lowered to 70 percent of the 1975 kill for the same period. Although the U.S. kill actually dropped to 33 percent for the comparable 1975 period, a suit was filed in the U.S. District Court for the District of Columbia on behalf of organizations of the environmental community that halted purse seining for tuna associated with porpoise effective May 31, 1976. The basis for the ruling was that NMFS failed to meet certain legal requirements of the Marine Mammal Protection Act (MMPA) in issuing a

2/ Address requests to Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Volumes I, II, IV, V, cost $1.60 ea. Volumes III, VI, VII cost $1.70 ea. Volume VIII costs $1.80 ea.

general permit to the tuna industry. In appealing the court decision, NMFS announced its intention to impose an incidental kill quota of 78,000 porpoise, to expand its observer program to more effectively monitor the quota, and to expedite efforts to determine the existing and optimum porpoise populations for each species involved in the tuna fishery. A subsequent ruling by the U.S. Circuit Court of Appeals upheld the lower court ban, but ruled that porpoise fishing could continue through 1976. The stay was granted to avoid a disastrous impact on the industry, to allow sufficient time for NMFS to comply with the MMPA requirements, and to enable ongoing cooperative gear development studies to be completed throughout the entire fishing season.

Further court action was initiated when NMFS announced that the 78,000 porpoise quota would be reached on October 19, 1976. Data provided by scientific observers placed aboard 54 U.S. tuna vessels were used to monitor the incidental kill rate and make projections on the closure date. Industry challenges on administrative procedures used to set the quota were overturned; the prohibition of fishing tuna associated with porpoise went into effect on November 11, 1976. The preliminary estimate of incidental porpoise kill in 1976 was 104,000, a significant reduction from the 134,000 porpoise killed in 1975.

Efforts in 1976 to reduce the incidental kill of porpoise during yellowfin tuna purse seining focused on evaluating and testing modifications in fishing techniques and gear. In cooperation with the industry-sponsored Porpoise Rescue Foundation, NMFS fielded an experiment in which 20 vessels compared the recently developed Bold Contender System to a similar system lacking a portion of webbing that some thought might not be needed. This mass test showed that the most successful developments to date include: (1) the use of speedboats to prevent net collapse; (2) the installation of small-mesh webbing and other net modifications to prevent porpoise deaths by net entanglements; and (3) the addition of a small raft with snorkel and face mask to be used by one of the rescuers to ensure that porpoise resting on the bottom of the net are released before the fishing operation is completed. These techniques and others tested during a charter cruise late in 1976 resulted in a very low kill rate that, when employed effectively by the remainder of the fleet under normal fishing conditions, may contribute to a further overall reduction in porpoise mortality.

Preparation of 1977 regulations began in mid-1976 emphasizing management deficiencies identified in the U.S. District Court ruling. An international panel of experts on population analysis was convened at NMFS La Jolla Laboratory to study existing and optimum populations of each porpoise stock. The panel determined that as many as 21 porpoise stocks could be involved in the fishery. These stocks were stable or increasing except for the whitebelly spinner dolphin that has more recently come under fishing pressure.

Some of the more important research efforts in 1976 to understand the present make-up and status of these porpoise populations in the eastern Pacific include:

o A major sea survey to study the abundance and distribution of porpoise stocks in the offshore boundary areas of the yellowfin tuna fishery in the eastern tropical Pacific Ocean. This survey resulted in expanding the documented range of porpoise stocks involved in the tuna fishery.

o Life history research to refine earlier estimates of reproductive and growth parameters of the offshore and Eastern spinner dolphin, and increased emphasis to determine these parameters for the striped, whitebelly spinner, and common dolphin stocks.

o The addition of about 75,000 pages of data collected during 20 cruises that involved gear technicians and 54 cruises that had observers aboard U.S. tuna seiners. These data include: (1) porpoise life history, distribution, school size, biology; (2) environmental conditions; (3) fishing conditions; and (4) effectiveness of regulations.

Evaluation continued of the techniques or procedures that are required under the regulations during purse-seine operations to reduce porpoise mortality so that such procedures may be modified or improved. An analysis of the effectiveness of the regulations governing fishing techniques in 1976 showed that the backdown procedure (in which the net is pulled from under the porpoise) is the most significant porpoise rescue procedure (fig. 14). However, the use of speedboats to hold the purse-seine net open and manual release by rescuers were also instrumental in reducing mortality. These data also show that the 2-inch mesh safety panel in the net caused considerable entanglement; a longer and deeper panel of 1 1/4-inch mesh was

Figure 14.-Porpoises leaving the tuna purse-seine net during the backdown procedure. Most effective procedure for rescuing porpoises while fishing for tunas associated with porpoises.

more effective in reducing porpoise mortality by entanglement.

The results of an international workshop, the gear studies, and the evaluation of observer data provided the basis for proposing 1977 regulations. For the first time, estimates of optimum sustained population for 13 species and stocks were presented; individual species and stock quotas were proposed. The new regulations also include new mesh size requirements for the porpoise safety panel, new procedural and equipment requirements, and more stringent yellowfin tuna importation requirements.

These regulations were discussed in a 3-week Administrative Law Judge hearing in Washington, D.C., and San Diego during which over 3,000 pages of testimony were presented.

SPECIALIZED PROGRAMS

AQUACULTURE

Aquaculture can be expected to add significantly to the present commercial and recreational harvests of selected species. NMFS aquaculture programs provide the biological and technological information needed by private industry for commercial development and/or by public agencies to augment natural stocks. Research focuses on solving such long-range problems of currently farmed fish and shellfish as: (1) developing genetic strains that grow rapidly on cost-effective diets, are disease resistant, and have desirable market characteristics; (2) determining nutrient requirements related to growth and disease resistance; and (3) identifying, controlling, or preventing disease-causing mortality to cultured animals.

Aquacultural research at the Milford (Conn.) and at the Oxford (Md.) Laboratories, components of the Northeast Fisheries Center, concentrated on genetics, spawning and rearing, nutritional requirements, and disease studies of mollusks.

The genetics work stressed the selection, inbreeding, and hybridization of American oysters to provide information on how to create and maintain commercially desirable strains for hatchery operations. Bay scallops and surf clams were used in the spawning and rearing research because of their aquacultural potential. Various levels of temperature, feeding, water exchange, and chemicals/antibiotics/radiation to prevent disease were used to improve present spawning and rearing techniques.

Nutritional studies were made to support hatchery programs in rearing larval mollusks. Two pioneer operations were developed: (1) to preserve marine unicellular algae by cryogenic techniques; and (2) to grow algae on various types of paper substrates that are simple, inexpensive, and permit long-term viability of the cultured strains.[3/] As a service to the aquaculture community, large volumes of food from ongoing mass algal cultures were provided to commercial shellfish hatcheries during periods of emergency.

The disease program personnel developed highly effective antibiotics for reducing larval oyster mortalities. Diagnostic services were also provided on fish and shellfish disease problems in commercial hatcheries. In 1976, 1,200 specimens from 22 different organizations were examined.

In support of aquacultural programs, disinfectants were tested to eliminate pathogens from hatchery systems. Ultraviolet light and ozone have shown promising results. Ozone has removed paralytic shellfish poisons from edible parts of clams and mussels.

Intensive culture (rearing animals in manmade ponds, raceways, or tanks where considerable environmental control is exercised) of penaeid shrimp is being conducted at the Southeast Fisheries Center's (SEFC) Galveston, Texas, Laboratory. The second harvest of white shrimp (*Penaeus setiferus*), reared at high densities in a closed system, was completed. The principles and techniques of this experiment can be applied to rear larger shrimp and many other marine animals in a closed system.[4/]

Another major program at Galveston is finding a dependable method for sexually maturing female shrimp in captivity--a major barrier to commercial development. Research is directed at basic reproductive biology to eliminate this inhibiting factor. *In vitro* fertilization studies have been enhanced by a technique for the control of the egg cortical reaction and a better understanding of gamete fusion. This understanding has been facilitated by the production of labeled antibodies to contractile proteins essential for fertilization.

In 1976, the SEFC College Park, Maryland, Laboratory commenced a program on the nutritional requirements of the freshwater prawn Macrobrachium, a species possessing high potential for commercial aquaculture development. During the year, a cooperative research agreement was made between South Carolina's Marine Resources Research Institute (MRRI) and the College Park Laboratory, to plan and execute necessary nutritional research to assure resolution of one of the major constraints preventing commercialization of this species.

The Northwest and Alaska Fisheries Center's Auke Bay Laboratory in Alaska and the Manchester field station in Seattle continued salmon aquaculture programs in 1976 that have application to both commercial and recreational fishing activities. Alaska's projects focused on research elements such as substrate incubation systems, carrying capacity of natural rearing systems, and solving genetics problems associated with ocean ranching. These programs are cooperative studies with the Alaska Department of Fish and Game.

At Manchester, research was directed primarily at developing marine culture techniques for Pacific salmon which include disease studies, evaluation of diets containing alternate protein sources (single cell proteins), color-producing additives, and the effects of feeds on fertility and fecundity of broodstock. Disease studies centered on defining immune mechanisms, developing vaccination techniques, and investigating nutritionally induced diseases.

3/ Ukeles, R., and J. Bishop. 1976. An unusual method for culture of unicellular marine algae. J. Phycol. 12(3):332-335.

4/ Mock, C. R., L. R. Ross, and B. R. Salser. _____. Design and preliminary evaluation of a closed system for shrimp culture. Proc. World Mariculture Soc. In press.

MARINE MAMMALS

Under the Marine Mammal Protection Act of 1972 (Act), NMFS is charged with the conservation, protection, and management of whales, porpoises, seals, and sea lions. The Act, with certain exceptions, placed a moratorium on the taking and importation of all marine mammals and marine mammal products. Principal activities in administering the Act have been waivers of the moratorium; issuance of permits for incidental catch of marine mammals in commercial fishing, scientific research, and public display; enforcement of the provisions of the Act; promulgation of regulations to control the taking of marine mammals; research and surveys to determine the status of marine mammal population stocks; cooperation with the States; and international agreements to conserve and manage marine mammals.

Incidental Catch

o Porpoise mortality incidental to the U.S. tuna purse-seine fishery remains one of the most significant problems facing the administration of the Marine Mammal Protection Act. The Act and its legislative history directs that the mortality and serious injury of marine mammals be reduced to insignificant levels approaching a zero mortality and serious injury rate. Although there has been progress in reducing porpoise mortality through improved technology and fishing practices, the time required to attain this statutory goal cannot be predicted.

Waivers of the Moratorium

o The Fouke Company applied for a waiver of the moratorium to allow the importation of raw sealskins from South Africa and Southwest Africa for processing. A public hearing was held in 1975 and in February 1976, and a Final Environmental Impact Statement was issued. The Director adopted the Administrative Law Judge's conclusion on several issues, deciding to waive the moratorium on skins from South Africa under certain specific conditions. Because of foreign policy considerations, the Director denied importation from Southwest Africa (Namibia). Following a review of the 1976 South African harvest, the waiver was continued. The Fouke Company applied for and was granted a permit to import 13,000 sealskins under the waiver.

o To return management of nine species of marine mammals to the State of Alaska, the State has applied to have the moratorium waived and regulations certified. A Draft Environmental Impact Statement (DEIS) and proposed regulations were published in February 1976. Hearings were convened in Alaska on June 29, 1976, in Anchorage; on July 6 in Nome; on July 12 in Bethel; and on July 14 in Anchorage. On July 21, the hearing was concluded in Washington, D.C. A decision will be made in 1977 by the Directors of NMFS and the Fish and Wildlife Service.

Marine Mammal Depletion Listings

The Hawaiian monk seal (Monachus schauinslandi) was designated as a depleted species on September 1, 1976, throughout its range. This species may have declined in number of individuals to a significant degree over recent years, and may have further declined historically to the point that, if such decline continues, it would become subject to the provisions of the Endangered Species Act of 1973. It has since been listed as endangered.

Optimum Sustainable Population

NMFS developed an operational definition of "optimum sustainable population," a key concept of the Act, which is broadly applicable to marine mammal population dynamics, and is phrased in quantifiable terms.

Law Enforcement

o The first criminal prosecutions under the Act convicted two conspirators involved in the illegal capture, possession, and sale of bottlenosed dolphins.

o An investigation into an illegal importation operation was concluded by seizing 450 sea lion skins from South America.

o Contracts were renegotiated with Alaska, Washington, Oregon, California, and Florida that provide Federal funds to those States for enforcement of the provisions of the Act.

o The first administrative hearings for alleged violations of the Act were held in 1976. One hearing ruled that the Native exemption of the Act applies only to Natives subject to the jurisdiction of the United States rather than to all Arctic Eskimos, as the defendant contended.

Public Display and Scientific Research Permits

On January 1, 1976, three permit applications were pending action. During the year, 28 permit applications were submitted. Of those 31 applications, 24 were approved, 1 withdrawn, 1 returned to the applicant, and 5 remain under consideration.

International Aspects

o The Ad Hoc Interagency Committee on an International Marine Mammal Program convened to develop a government-wide U.S. marine mammal program.

o At the 28th Session of the International Whaling Commission (IWC) in June 1976, the United States continued efforts to make the Commission's conservation measures conform with the Marine Mammal Protection Act. The success of these efforts is shown in several conservation measures adopted by the Commission. Progress was made in a number of areas; i.e., renegotiation of the International Convention, addition of new management procedures, imposition of a requirement that member nations report catches of small cetaceans to the IWC, and provision of additional protection for some stocks. Specifically, fin whales in the Southern Hemisphere are totally protected; mink whales in the North Pacific are subject to IWC quotas for the first time; Bryde's whales in the Southern Hemisphere cannot be commercially harvested until more scientific data are available; quotas on sperm whales in the Southern Hemisphere were reduced by nearly 6,000 animals.

o The Protocol amending the Interim Convention of Conservation of North Pacific Fur Seals was ratified by the four parties to the Convention. The Protocol extends the Convention for an additional four years, and modifies a number of the Convention's fur seal conservation measures.

o The United States ratified the Convention on the Conservation of Antarctic Seals.

o Under the U.S./U.S.S.R. Marine Mammal Project, Environmental Protection Agreement, three joint research projects were conducted involving the cooperative exchange of U.S.-Soviet marine mammal scientists.

o The Food and Agriculture Organization's Advisory Committee on Marine Resources Research (ACMRR) Working Party on Marine Mammals met from August to September 1976, in Bergen, Norway, to examine the status of all marine mammals. A summary report is expected by April 1977.

o At the 1976 Annual Meeting of the Inter-American Tropical Tuna Commission, the United States continued its efforts to achieve international action to reduce the incidental take of marine mammals. It also reviewed the general direction of its national policy on the tuna/porpoise problem, noting the probability that beginning in 1977 the U.S. tuna fleet would be subject to quotas on various stocks of porpoise. In addition, similar standards would be applied to foreign fleets engaged in the purse-seine tuna fishery.

Research and Development Program

Research is conducted by NMFS on whales, porpoises, seals, and sea lions to provide information necessary for developing and continuing rational policies of resource management.

Cetacean research conducted by the Northwest and Alaska Fisheries Center concentrated on testing of remote, implanted radio tags in humpback whales occurring seasonally in the Frederick Sound area of southeastern Alaska. Radio tagging offers good potential for estimating population size, distribution, and migration routes. Although several whales were successfully tagged and tracked in the immediate area, considerable improvements will be needed to ensure that the tag will function for the two to six months necessary to provide meaningful migratory information.

Bowhead whale research in the Arctic Ocean and Bering Sea areas was expanded by an additional counting station at Point Barrow. A total of 335 bowheads passed that location. Additional counting stations were planned at key locations to determine the total population inhabiting these waters.

Research conducted by personnel of the Northwest and Alaska Fisheries Center in 1976 was aimed at determining and reversing the decline of the Hawaiian monk seal. It also studied the possible effects on humpback whales of hydrofoil vessels used on inter-island runs in the Hawaiian Islands area. Based on 1976 population counts, the population of monk seals is estimated at 696, and the seasonal population of humpback whales in Hawaiian waters is 373. A total of 3,797 gray whales was observed migrating past the NMFS counting station at Yankee Point, Calif. This

compares with a 5-year average of 3,306. An intensive 7-month photodocumentation study of killer whales found that the previous estimate of about 68 whales residing in Puget Sound and adjacent waters is correct. Through photos, details of resident and transient pod composition were documented, and their movement patterns identified.

Mass strandings of cetaceans are fairly common and provide unique opportunity for collecting biological data. Three major mass marine mammal strandings were investigated on the Florida west coast in July. In one of the strandings at Dry Tortugas, 28 (1 died) false killer whales were successfully "unbeached" and returned to sea (fig. 15). This was the first recorded case of a significant number of marine mammals being forced from a beach without a subsequent restranding.

Agents disposed of or cared for 87 animals which were stranded on the shorelines of the Northeast Region. The majority of the animals, ranging from small harbor seals to large whales, were found dead and were disposed of in accordance with the law. The remaining live animals were placed under competent veterinary care.

ENDANGERED SPECIES

NMFS is responsible for managing and conserving endangered and threatened species of fish and wildlife, pursuant to the Endangered Species Act of 1973. The Department of Commerce has jurisdiction over those marine species listed as endangered or threatened: blue, bowhead, fin, gray, humpback, right, sei, and sperm whales; Hawaiian and Mediterranean monk seals; shortnose sturgeon; leatherback sea turtle. Jurisdiction over sea turtles is currently shared with the Department of the Interior.

The Act, with certain exceptions, prohibits the taking, importing, or exporting of endangered species and their parts or products. For threatened species, the Act authorized discretionary rulemaking to provide for species conservation. Administrative responsibilities include development and review of regulations; conduct and representation at required hearings; review and study of State laws and regulations, management programs, and compliance with Federal regulations; administration of grants and contracts to assist in developing and implementing State programs for the protection of endangered and threatened species; issuance of permits for takings, imports, and exports; and review of applications for scientific research, propagation, survival, and economic hardship exemptions. The decision to grant or deny a permit application involves a thorough review of the application that may include scientific evaluation by State and NMFS officials, and inspection of the applicant's facilities. Public comments are solicited and considered on each application.

Enforcement responsibilities are directed toward prohibiting unauthorized importation of endangered species and their parts or products and to controlling the taking, possession, sale, delivery, and transportation of listed species in the United States. Activities authorized under permit are also monitored.

o After researching the status of several candidate species, the Hawaiian monk seal was listed as endangered on November 23, 1976 (41 F.R. 51611) and the totoaba (a Mexican weakfish) was proposed on December 30, 1976, for listing as endangered (41 F.R. 56839). Research was continued on whales and sea turtles. The status of Guadalupe fur seal stocks and northern elephant seal stocks was also researched for possible future action.

o The first major criminal investigation under the Act was completed. The case involved the interstate sale and transportation of sperm whale scrimshaw. In the Southeast Region alone, 218 endangered species cases were closed during 1976 with 320 items forfeited to the Government and $13,275 collected in penalties. Interim regulations governing Certificates of Exemption for pre-Act commercially held endangered species parts and products were published on August 18, 1976 (41 F.R. 34970).

o The mechanism for State/Federal Cooperative Agreements and State financial assistance was completed in 1976. Final regulations governing Cooperative Agreements and grant-in-aid awards were published on June 16, 1976 (41 F.R. 24354) and a final model for Cooperative Agreements was submitted to the States in October 1976. States that enter these agreements will manage the taking of certain indigenous endangered or threatened species, and will be eligible for financial assistance from the Federal Government on a matching basis.

o In January 1976, NMFS published its Draft Environmental Impact Statement (DEIS) on the NMFS/FWS proposal to list green, loggerhead, and Pacific ridley sea turtles as threatened species. On February 25-26, NMFS held public hearings on the proposed sea turtle regulations and DEIS. On October 27, 1976, NMFS held a public meeting in Tampa, Fla., on our marine turtle management program. Final regulations and an Environmental Impact Statement have been drafted on the listing of green, loggerhead, and Pacific ridley sea turtles.

o Eleven scientific purposes permits involving the shortnose sturgeon and several endangered whale species were issued.

o After sponsoring an Interagency Committee on Federal agency responsibilities, NMFS and FWS published guidelines on interagency cooperation and critical habitat responsibilities under Section 7 of the Act. Proposed regulations were subsequently drafted by both agencies.

o The Hawaiian monk seal was listed as an endangered species November 23, 1976 (41 F.R. 51611). The totoaba was proposed as an endangered species December 30, 1976 (41 F.R. 56839). Guidelines were prepared for recovery teams and recovery plans. Efforts were initiated to have a recovery team for shortnose sturgeon.

As a member of the Scientific Authority to the Convention on International Trade in Endangered Species of Wild Fauna and Flora, NMFS participated in the First Conference of Parties to the Convention, held in November 1976, in Berne, Switzerland. NMFS was successful in its petition to have the various stocks of both fin and sei whales listed on Appendices I or II, and the totoaba listed on Appendix I. In addition, the leatherback, Pacific hawksbill, green (except for Australian populations), loggerhead, and Pacific ridley sea turtles, as well as the Amsterdam Island, Kerguelen, New Zealand, and South African fur seals, were transferred from Appendix II to Appendix I of the Convention.

The following Reports were prepared:

1. Draft EIS on "Proposed Listing of the Green Sea Turtle (Chelonia mydas), Loggerhead Sea Turtle (Caretta caretta), and Pacific Ridley Sea Turtle (Lepidochelys olivacea) as Threatened Species Under the Endangered Species Act of 1973";

2. Final EIS on "Waiver of the Moratorium on the Importation of South African Sealskins;

3. Draft EIS on "Consideration of a Waiver of the Moratorium and Return of Management of Certain Marine Mammals to the State of Alaska";

4. "Report of the Secretary of Commerce on Administration of the Marine Mammal Protection Act of 1972, from April 1, 1975, through March 31, 1976";

5. Final EIS on "Renegotiation of Interim Convention on Conservation of North Pacific Fur Seals";

6. A Proposed Issuance of Permits to Commercial Fishermen Allowing the Taking of Marine Mammals in the Course of Yellowfin Tuna Purse Seine Operations";

7. "Report of the Workshop on Stock Assessment of Porpoise Involved in the Eastern Pacific Yellowfin Tuna Fishery";

8. "Progress of Research on Porpoise Mortality Incidental to Tuna Purse-Seine Fishing for Fiscal Year 1976."

HABITAT PROTECTION

"We cannot permit the depletion of our fish stocks and the destruction of fish habitats to continue," states A Marine Fisheries Program for the Nation (p. 3).

Figure 15.-False killer whales being herded off the beach at Dry Tortugas on July 25, 1976.

NMFS looks forward to fulfilling the spirit and letter of the new fisheries program and its goal to "conserve, restore, and enhance fish habitats" (p. 6).

Conservation and management of our fisheries depend on the protection and preservation of fish habitats. This can only be accomplished by cooperation between the various Federal and State agencies and between the management and research elements of NMFS. This spirit of cooperation is shown in the memoranda of understanding exchanged in 1976 between the NMFS Southeast Region, the Louisiana Department of Wildlife, the U.S. Fish and Wildlife Service, and the U.S. Army Corps of Engineers to coordinate environmental review of leases and permits for shell dredging. The Southeast Region's recently completed Habitat Protection Program Development Plan emphasizes coordination between agencies at all levels of government as the key to a successful program.

NMFS' primary obligation is to protect and conserve the marine, estuarine, and anadromous fish environment. Its role has been referred to as "management by influence" because NMFS reviews, comments, and advises, but does not have statutory authority to veto decisions made by other Federal agencies. Expertise in environmental assessment influences the decision-makers serving the public interest. Over 25,000 permits and licenses issued by Federal agencies to private developers and proposed Federal construction affecting living marine resources were received.

The following are examples of how management by influence works: Based in part on NMFS objections to unnecessary destruction of valuable fish habitat by construction of a massive housing development, the Corps of Engineers denied two of three permits to dredge and fill at Marco Island, Fla. The decision prevented destruction of more than 2,000 acres of mangrove wetlands and several hundred acres of shallow bay bottom.

Restoration of habitats illegally filled in the Chesapeake Bay were ordered by the Corps of Engineers.

The Northeast Region's role as mediator in a controversial Thames River dredging project brought a letter of appreciation from Connecticut Governor Ella Grasso.

The Regions participate in comprehensive planning efforts and supply scientific data regarding habitat to State Coastal Zone Management Programs, the Regional Fishery Management Councils, and other groups involved in water resources planning. For example, the Northeast Region is a member of the Virginia Governor's Task Force on Dredge Disposal and the new Chesapeake Bay Disposal Study group. Implementing the Coastal Zone Management Act has greatly enhanced comprehensive planning to include protection of fishery resources.

The Regions (management) and Centers (research) support one another in almost all phases of their program operation and management. Environmental research by the Southeast Fisheries Center (Beaufort Laboratory) to assess man's activities on fishery productivity in estuarine and coastal waters was used by the Regional Office to review environmental impact statements, to present testimony at public hearings, and to advise on the effects of proposed habitat alterations on fishery productivity. Fifteen published manuscripts showed the results of this research effort.

Timber harvesting, a major industry in Alaska, has the potential to affect estuarine resources and their environment. Alaska Region personnel investigated the effects of log dumps and log-raft storage on estuaries. In their report, recommendations were made to the U.S. Forest Service to reduce the effects of these logging activities. Concern for increased timber harvest in the Tongass National Forest and its possible effects on salmon production prompted development of a long-range plan for multi-agency research. The U.S. Forest Service accepted guidelines covering development and other practices affecting streams, wetlands, and estuaries recommended by personnel of the Alaska Region for the Tongass National Forest.

Timber activities in Alaska affect the compaction of intertidal areas by grounding rafts of logs at low tide. The Corps of Engineers agreed to NMFS recommendations to place a stipulation on all Section 10 permits for log-raft storage areas, prohibiting the grounding of log rafts at any tidal stage.

Dredge and fill are long-standing habitat problems; petroleum operations and chemical contaminants have affected habitats for a long time, but have only recently gained national attention. As Kepone, the Argo Merchant, and PCB's became household words in 1976, NMFS Regions and Centers were involved in programs to study and monitor these problems.

The Northwest and Alaska Fisheries Center started studies on the effects of multiple contaminants, environmental changes, and the capability of fish to adapt to pollution. The State of Virginia requested the Northeast Region's participation in a task force to examine the effects of the pesticide Kepone in the James River and Chesapeake Bay ecosystems.

The Argo Merchant spilled 7.5 million gallons of crude oil onto Nantucket Shoals. The Regional Office responded to public inquiries on the disaster, worked with the Northeast Fisheries Center to set up monitoring studies, and will work with other agencies to review existing contingency plans and define agency obligations and roles. The Northeast Regional Office participated in national and international meetings concerning the environmental impacts of a proposed oil refinery in Maine.

Environmental studies at the Northwest and Alaska Fisheries Center (Auke Bay Laboratory) focused on ways of measuring future impacts of oil pollution on marine and freshwater environments. Oil toxicity tests with crude oil and refined products were conducted on Alaska marine and fresh water species at different life stages and temperatures. In their early stages, shrimp and crab were found to be extremely sensitive to oil, especially during molting. Oil concentrations in the parts-per-billion range were found to affect survival.

Environmental studies at the Northeast Fisheries Center included: the physiological effects of pollutant stress; environmental chemistry; coastal monitoring, assessment, and prediction; fish behavior under stress; and coastal ecosystems. The coastal monitoring, assessment, and prediction efforts, mostly in Cape Cod and Massachusetts Bays, provided new information on the spawning and nursery grounds of American lobster. Scientists studying the coastal ecosystems completed a benthic survey of areas affected by the New London Harbor dredging project. The survey included the impacts of dredge-spoil disposal on benthic fauna of eastern Long Island Sound and an evaluation of an alternate dump site. At the same time, New York Bight studies were showing that gills of rock crabs were becoming fouled with sewage sludge and dredge-disposal silt following molting. Another survey in the vicinity of the 1976 New Jersey fish kill-bottom anoxia problem assessed the phenomenon's impact on bottom fauna and the food chain. In a supplementary study, a sewage-sludge tracking effort was conducted in the New Jersey fish kill area.

Other investigations studying the possible causes of the New Jersey fish kill are not completed and conclusive reports are not yet available.

"In view of the recent emphasis on the Outer Continental Shelf, care must be taken to ensure that such operations are conducted in a manner that is compatible with the continued availability of these areas as fish habitats," states A Marine Fisheries Program for the Nation (p. 17). The Regions participated in Outer Continental Shelf (OCS) leasing and development activities particularly in the Northeast, Southeast, and Alaska. The Bureau of Land Management's (BLM) sale of Outer Continental Shelf Oil Leases in the Northeast Gulf of Alaska resulted in increased activity associated with offshore oil exploration for the Alaska Region. Coordination between that region and the oil industry recommended that the operating procedures be adopted by both the applicants and the regulatory agencies. The Region assisted an oil company in developing a study to determine the effects of offshore drilling fluids on Cook Inlet organisms. Region personnel collected the necessary organisms and monitored the study performed by a private consultant and funded by the oil company. The Region provided resource assessments to BLM for the OCS lease sale. Much of their data and recommendations were incorporated into the environmental impact statements written for the proposed sale.

NMFS successfully requested that the Environmental Protection Agency (EPA) reverse a preliminary decision requiring ocean dumping permits for discharges from anchored, floating drilling vessels on the Outer Continental Shelf. NMFS believed the National Pollution Discharge Elimination System (NPDES) permits would be more appropriate because the drilling vessel becomes, in effect, a "drilling rig or platform," for which NPDES regulations already exist. EPA agreed to reverse their earlier opinion.

The Southeast Fisheries Center (Galveston Laboratory) initiated a study to assess the environmental effects on marine resources and their habitats of an oil and gas field in production for several years in the Northwest Gulf of Mexico.

COLUMBIA RIVER FISHERIES DEVELOPMENT PROGRAM

The Columbia River Fisheries Development Program (CRFDP) helps preserve and maintain the anadromous fisheries of the Columbia Basin. The program has sponsored the construction of 86 fishways, 720 fish screens, and the construction and operation of 22 hatcheries and 4 rearing ponds.

The Program focused its efforts in 1976 on increasing the production of salmon and steelhead trout being raised in 22 fish hatcheries funded by NMFS.

o Added hatchery production of fish was provided through special appropriations to increase fish harvests by Indian and non-Indian recreational and commercial fisheries.

o New rearing ponds have been added at Elokomin (fig. 16), Klicikitat, Herman Creek, and Washougal Hatcheries. Collectively, these new installations will rear nearly 2.5 million yearling salmon, and are anticipated to increase salmon harvests by 500 tons annually. These ponds are unique because they are constructed mainly of soil and rock, using only minimal amounts of concrete. They will require no specialized pollution abatement facilities because the wastes will settle within the pond, and will need only periodic cleaning when the pond is drained to release the fish.

This economical type of salmon-rearing facility was not feasible in the past because of the inability of fish culturists to cope with diseases. Pelleted food is used and dispensed by a furnace-type blower mounted on a vehicle driven around the perimeter of the pond while feeding. The cost of dirt-rearing ponds is less than half of concrete structures. Presently, a 1-acre dirt pond costs about $80,000 to construct.

Figure 16.-U-shaped gravel-rearing pond at Elokomin Hatchery. Inlet on the right, outlet on the left. Peninsula in center facilitates distribution of fish food to all areas of the pond.

Structural designs for Pollution Abatement facilities were completed on abatement structures for Klaskanine, Eagle Creek, Abernathy, Kalama, and Skamania Hatcheries. Contracts were granted and construction completed at Gnat Creek, Kalama, and Eagle Creek. Structural designs were initiated on 10 more CRFDP hatcheries, leaving only three stations not on the drawing board.

A large multi-drummed fish screen funded by NMFS was completed and placed in operation by the Idaho Department of Fish and Game. This screen (S-28) is located on a large water diversion from the Salmon River near Challis, Idaho. In the past, many thousands of young salmon were lost by entering this diversion. In the first month of operation over 100,000 young salmon were safely bypassed back to the river at this screen site.

In addition to supplying fish to the fisheries, CRFDP funded hatcheries provide an educational and recreational experience for hatchery visitors. At some hatcheries special facilities have been constructed for visitors. To determine the value of this benefit and if expenses for visitor facilities are economically justified, we have conducted a 2-year questionnaire survey at six CRFDP hatcheries. Preliminary estimates of the first year's data show a benefit of over $100,000 at Bonneville Hatchery.

Engineering tasks within the CRFDP are performed by the Fish Facilities Section, comprised of three hydraulic engineers and one biologist. The primary responsibility of this section is to assist in developing functional designs for fish protective facilities at Federal or federally funded water development projects and at projects licensed by the Federal Power Commission. The section is concerned primarily with projects in the Columbia River Basin, but frequently aids in designing fish facilities for projects throughout the country.

During the past year, the Fish Facilities Section has been involved in planning and design review of fish facilities for over 15 water development projects. Most of these were in the Northwest Region, but locations ranged from Maine to Alaska. On the Columbia River, the Section has been involved in planning and reviewing fish passage facilities for two new powerhouses at these dams; each will require elaborate fish-collection facilities, fish bypasses, and fish ladders to permit adult and juvenile salmon to pass safely around those obstructions during their upstream and downstream migrations. The Section also has reviewed and assisted in developing designs for fish screens at numerous irrigation, industrial, and thermal power plant water diversions on the Columbia River.

PRIBILOF ISLANDS MANAGEMENT

The Fur Seal Act of 1966 (80 Stat. 1091) charges the Secretary of Commerce with management of the northern fur seal and administration of the Pribilof Islands. It also implements for the United States the Interim Convention on Conservation of North Pacific Fur Seals (a treaty to protect northern fur seals) between Canada, Japan, the U.S.S.R., and the United States.

The Act requires, among other things, that NMFS (1) conduct, during a short period each summer, a harvest of those fur seals surplus to the needs of the herd, (2) conduct scientific research on the fur seal herds, (3) employ natives of the Pribilof Islands, and (4) provide for the welfare of the natives of the Islands.

Commercial harvesting of the northern fur seal is now conducted only on St. Paul Island. St. George Island has been designated for an indefinite period as a conservation area for scientific research on northern fur seals through agreement with the governments involved in the Interim Convention on Conservation of North Pacific Fur Seals. However, on St. George, in 1976, as agreed to by the governments in the Interim Convention, there was a small harvest of 200 seals for Native subsistence. The harvest of fur seals for 1976 was 23,188; the U.S. share was 16,221.

Under the Alaska Native Claims Act of 1971, the Natives of the Pribilofs will soon receive over 90 percent of the land of the islands. The remainder, retained by the Government, is the amount considered necessary for the operation of Government facilities and protection of the fur seals as required in the international treaty. Because the separately owned lands and facilities are adjacent and will at times be used by both the Native corporations and the Government, an agreement for such joint use was negotiated. This agreement included a Memorandum of Understanding Regarding Pribilof Islands Land Selection and an arrangement to establish the Pribilof Islands Joint Management Board, completed in 1976.

On October 12, 1976, the 1976 Protocol Amending the Interim Convention on Conservation of North Pacific Fur Seals was ratified by the four parties to the Convention. The Protocol extends the Convention for an additional four years, and modified a number of the Convention's fur seal conservation measures.

Northern fur seal research in the eastern Bering Sea centered on evaluating the effects of the 1973 St. George Island harvest moratorium, analyzing pelagic data collected from 1958 through 1974, and determining the causes for the high rate of mortality among pups during their first year. Annual monitoring of the small colony of fur seals on San Miguel Island, Calif., and nearby Castle Rock indicates that the number of pups has increased from 123 in 1972 to almost 1,000 in 1976.

CENTRAL, WESTERN, AND SOUTH PACIFIC FISHERIES DEVELOPMENT PROGRAM

Developing the tuna and other latent fisheries resources of the Central, Western, and South Pacific Ocean is authorized by Public Law 92-444 (September 29, 1972) as amended by Public Law 94-343 (July 6, 1976).

This fishery development program was launched by forming the Pacific Islands Development Commission (PIDC) in 1970 as a nonprofit corporation. After funding was obtained, the Pacific Tuna Development Foundation (PTDF) was formed as a nonprofit corporation to carry out the development program. Full support (over $1.6 million) for the 1975 program was provided by funds from NMFS, matching funds from industry and PIDC, and carryover funds.

- Skipjack tuna fishing using deeper than normal nets was successfully tested by using chartered vessels. The tests show that use of lighter nets, smaller boats, and natural and artificial floating objects to attract fish would improve catch rates and chances for an economically viable skipjack tuna fishery in the Pacific areas under study.

PUBLIC AFFAIRS

The Public Affairs activities of NMFS are coordinated by the Public Affairs Officer and his staff, who are detailed to NMFS and supervised by the NOAA Director of Public Affairs.

Liaison between NMFS and NOAA for public affairs activities is the responsibility of the NMFS Public Affairs Office. As a part of the staff of the NMFS Director, the Office is in close contact with the Assistant Directors as well as the Regional and Center Directors.

The Office (1) produces national news releases and feature items that reach as many as 1,500 news outlets across the Nation; (2) maintains a mailing list of about 700 outdoor writers who are sent selected news releases; (3) prepares articles for each issue of the quarterly periodical NOAA, and for Department of Commerce and other Federal publications (reprints of some articles are used throughout NOAA/NMFS for many purposes); (4) arranges for interviews of NMFS personnel by representatives of all media; (5) responds to inquiries from the press, radio and TV, and the general public; (6) maintains close contact with Regional Offices and Centers on matters of public interest; (7) provides representation at certain fisheries functions throughout the United States; (8) coordinates or prepares brochures, pamphlets, and similar material; (9) participates in preparing material for local and national exhibits related to fisheries matters; and (10) covers newsworthy events as required in the various NMFS Regions.

VESSEL ACTIVITIES

In 1976, NMFS field programs received ship support from the NOAA Fleet, by charter and from laboratory-managed small craft. Twelve vessels of the NOAA Fleet spent over 1,700 days at sea for NMFS; 23 separate vessel charters spent nearly 800 days at sea. (See table 1.)

The NOAA Fleet is operated and managed by the National Ocean Survey, Office of Fleet Operations. Ship time is granted by the NOAA Fleet Allocation Council. Charter ship time is provided on University, State, or privately owned vessels. Most of the NOAA ship and charter vessel time supported the resource assessment tasks of the Marine Resources Monitoring, Assessment, and Prediction (MARMAP) Program. The NOAA ship George M. Bowers was removed from active service late in 1976 because it was no longer seaworthy.

LAW ENFORCEMENT

Consonant with the national goal to conserve and manage living marine resources, NMFS special agents enforce a wide variety of Federal laws and regulations as well as provisions of various international treaties and agreements.

The major portion of the effort is directed at commercial fishing operations. Regulations promulgated under several U.S. laws apply to the domestic fishing industry. The Bartlett Act governed foreign fishing activities in 1976 by prohibiting foreign fishing in territorial waters and the contiguous fishing zone as well as the taking of Continental Shelf fishery resources.

To assure compliance with domestic regulations, NMFS special agents inspect U.S. vessel landings and fish-handling facilities. These inspections are often made in cooperation with other Federal and State law enforcement officials.

Enforcement at sea is carried out in cooperation with the U.S. Coast Guard. The Coast Guard provides the necessary aircraft and surface vessels; NMFS special agents provide enforcement and fisheries expertise. To enforce the provisions of the various laws, treaties, and agreements, the agents inspect both foreign and domestic fishing vessels at sea.

One primary goal of surveillance is to gather information on technological developments, innovations, and trends in foreign fishing off U.S. coasts. Surveillance data are especially useful in monitoring the accuracy of catch reports submitted by foreign governments or vessels. The detection of certain types of violations is often greatly facilitated by aerial surveillance. Despite extensive aerial and surface patrols, foreign fishing violations off our coasts continue.

In addition to fisheries laws, NMFS special agents enforce a variety of other Federal statutes. These include the Lacey Act and Black Bass Act which prohibit the importation and interstate trafficking in illegally taken fish and wildlife, and the Marine Mammal Protection Act and Endangered Species Act which prohibit, among other things, the killing, capturing, harassing. and importing of certain marine mammals, sea turtles, fish, and other creatures. Reports of alleged violations of the latter two Acts are frequently received from the public, protectionist organizations, and other law enforcement agencies. Investigating these complaints consumes a portion of NMFS enforcement resources.

TABLE 1.--NOAA ships supporting NMFS field programs

Ship	Length	Home Port	Area of Operations	Program Supported
ALBATROSS IV	187	Woods Hole, Mass.	NW. Atlantic	Resource Assessment
GEORGE M. BOWERS*	73	Miami, Fla.	SE. U.S. Coast (Inshore)	Resource Assessment & Technology
JOHN N. COBB	93	Seattle, Wash.	NE. Pacific & S. Alaska	Resource Assessment & Technology
TOWNSEND CROMWELL	163	Honolulu, Hawaii	Central Pacific	Resource Assessment
DELAWARE II	155	Sandy Hook, N.J.	NW. Atlantic	Resource Assessment
MILLER FREEMAN**	215	Seattle, Wash.	Bering Sea Gulf of Alaska	Resource Assessment & Energy Baseline
DAVID STARR JORDAN	171	San Diego, Calif.	East Central Pacific	Resource Assessment
MURRE II	86	Auke Bay, Alaska	SE. Alaska Coast	Resource Assessment & Station Support
OREGON	100	Kodiak, Alaska	Bering Sea Gulf of Alaska	Resource Assessment
OREGON II	170	Pascagoula, Miss.	West Central Atlantic Gulf of Mexico	Resource Assessment
RESEARCHER**	278	Miami, Fla.	Gulf of Mexico	Resource Assessment
SURVEYOR**	292	Seattle, Wash.	East Central Pacific	Marine Mammals

* Removed from service.
** In support of NMFS for only part of year.

Living marine resources and activities vary from region to region. Accordingly, enforcement activities show geographic differences. The bulk of enforcement work in the Northeast and Alaska Regions is directed at foreign fishing activities. The Southeast Region administers the United States-Brazil Shrimp Fishing Agreement, but the majority of the work in that region concerns enforcement of the Marine Mammal Protection Act and Endangered Species Act. Enforcement of these two Acts is an important function of the Southwest Region as is enforcing regulations on the yellowfin tuna fishery. One of the primary enforcement functions of the Northwest Region is the protection of salmon stocks under the terms of international agreements.

ENFORCEMENT HIGHLIGHTS for 1976

o Surveillance activities resulted in over 19,000 vessel sightings in fishing areas off U.S. coasts. Enforcement agents boarded and inspected 1,010 foreign and 956 domestic fishing vessels. Numerous documented violations of both U.S. laws and treaties with foreign countries were uncovered.

o Enforcement agents seized 20 foreign vessels in violation of fishery regulations, resulting in penalties of over $5.1 million.

o A record settlement of $700,000 was reached in a civil suit against the Japanese stern trawler Kohoku Maru No. 12. The vessel was seized April 14 by a joint NMFS-Coast Guard fishery patrol for taking and retaining king crab in the Western Aleutian Islands in violation of U.S. laws prohibiting the retention of Continental Shelf fishery resources.

o Agents investigated 288 cases involving marine mammals and related products and 350 cases involving endangered species. Quantities of sealskin products, sperm whale teeth, whale oil, and sea turtle products were seized.

o The first criminal case under the Marine Mammal Protection Act was tried in 1976 in U.S. District Court, Key West, Fla. Two individuals, charged with illegally taking 21 Atlantic bottlenose dolphins, were given jail sentences.

PROGRAM PLANNING, BUDGET, AND EVALUATION

Program and financial analysts in the Office of Program Planning, Budget, and Evaluation (formed in 1971 as the Plans and Policy Development Staff) advise the Director on planning, programming, policy coordination, budget formulation, execution, and evaluation of programs in achieving NMFS' mission, goals, objectives, and policies. In addition, they coordinate with other NOAA elements, Federal agencies, public and private organizations; advise on the design, development, and use of management and data information systems; coordinate the formulation, justification, and presentation of programs and budgets; evaluate the effectiveness of programs and activities; assist in executing the operating budgets; analyze authorized programs and recommend changes in order to accomplish the optimum use of funds and manpower; and monitor and administer NMFS' grant-in-aid programs conducted under Public Laws 88-309 and 89-304, as amended.

o Major accomplishments in 1976: (1) the successful application of the Zero Base Budgeting approach to the fiscal year 1979 budget submission; (2) developing a draft implementation plan for the Secretary's "A Marine Fisheries Program for the Nation;" and (3) reorganizing in order to better handle the additional workload stemming from the passage of the Fishery Conservation and Management Act of 1976 (Public Law 94-265).

BUDGET

To fund fishery activities in fiscal year (FY) 1977 (beginning October 1, 1976), $81,793,000 was available as of March 1, 1977: direct appropriations of $73,048,000 and Saltonstall-Kennedy (S-K) funds of $8,745,000 (see table 2).

Congress provided net increases of $11,775,000 over the FY 1977 adjusted base. Included is $9,991,000 in support of NMFS responsibilities under the Fisheries Conservation and Management Act of 1976 (out of $22 million appropriated to NOAA).

NMFS' budget allocations (including the adjusted base, increases, and other funding) for fiscal year 1977 are shown in table 3.

NMFS LITIGATION

NOAA's Office of General Counsel provides comprehensive legal counsel for NMFS and closely follows litigation that concerns it. The following major cases, among others, were filed in 1976, or prior to that year, but carried over into 1976.

Animal Welfare Institute, et al. v. Richardson, Civil Actions Nos. 76-0483, 76-0484 (U.S.D.C. and Circuit Court of Appeals, District of Columbia), commonly known as Fouke Case--Suit was filed March 24, 1976, seeking injunctive relief to prevent importation of Cape fur sealskins from South Africa by the Fouke Company of South Carolina. Plaintiffs challenged the legal adequacy of NMFS Director's 1976 administrative decision, that waived the Marine Mammal Protection Act moratorium and announced regulations that provided for issuing permits to import fur sealskins harvested in South Africa. On December 23, 1976, after the Director approved the Fouke Company's permit to import 13,000 fur sealskins from South Africa, the District Court dismissed the consolidated suits on the technical ground that the case did not affect a substantial interest of the plantiffs; hence, the plaintiffs lacked the standing to sue. An appeal was promptly filed with the U.S. Court of Appeals.

Delbay Pharmaceuticals, Inc. v. Morton, Civil Action No. 76-0056 (U.S.D.C. and Circuit Court of Appeals, District of Columbia)--The plaintiffs sought to prohibit NMFS from enforcing the Endangered Species Act regarding the interstate sale of endangered species products legally held in the United States prior to the Act.

Table 2.--Budget summary for FY 1977

Source	Adjusted Base FY 1977	Congressional Increase	Additional NOAA Funding	TOTAL FY 1977
	(Thousands of dollars)			
Direct appropriations*	61,083	11,775	190	73,048
S-K funds	8,745	---	---	8,745
Totals	69,828	11,775	190	81,793

* Do not include: (1) assets of the Fisheries Loan Fund that are based on repayments of loans and interest payments; (2) fees paid into the Fishermen's Guaranty Fund for participation in the program, including executive direction and administration, and other services provided by NOAA; (3) indirect budgetary resources available to NMFS from reimbursements and trust funds; (4) funds for NMFS vessels managed by NOAA's National Ocean Survey.

Table 3.--FY 1977 NMFS budget allocations by subactivity

Activity	Adjusted Base FY 1977	Congressional Increase	Additional NOAA Funds	TOTAL FY 1977
	(Thousands of dollars)			
Marine Resources:				
Assessment, Monitoring & Prediction (MARMAP)				
Direct appropriations	16,931	3,192	---	20,123
S-K funds	2,623	---	---	2,623
Total	19,554	3,192	---	22,746
Conserving Marine Resources				
Direct appropriations	15,743	1,310	---	17,053
S-K funds	139	---	---	139
Total	15,882	1,310	---	17,192
Restoring & Increasing Fishery Resources				
Direct appropriations	11,375	---	190	11,565
S-K funds	361	---	---	361
Total	11,736	---	190	11,926
Managing & Using Fishery Resources				
Direct appropriations	16,116	7,717	---	23,833
S-K funds	5,622	---	---	5,622
Total	21,738	7,717	---	29,455
Fisheries Financial Support Services				
Direct appropriations	918	(-444)	---	474
TOTALS				
Direct appropriations	61,083	11,775	190	73,048
S-K funds	8,745	0	0	8,745
Total	69,828	11,775	190	81,793

The District Court denied the injunction and upheld NMFS enforcement actions regarding pre-Act products. Although the case was appealed to the Circuit Court of Appeals, Delbay later moved for dismissal of the appeal as part of its settlement of the NMFS civil penalty proceeding against Delbay for violations of the Endangered Species Act.

Committee for Humane Legislation et al., v. Richardson, 414 F. Supp. 297 (U.S.D.C., District of Columbia, May 1976); affirmed 540 F. 2d 1141 (U.S. Circuit Court of Appeals, District of Columbia, August 1976)--Plaintiffs attacked regulations applicable to the incidental taking of porpoises during yellowfin tuna purse seine operations, adopted under the Marine Mammal Protection Act, and the general permit issued under those regulations to the American Tunaboat Association. The District Court concluded that the regulations were not promulgated in accordance with the procedures required by the Act and thus declared the regulations and the general permit issued thereunder to be invalid. The Court of Appeals affirmed the District Court's action, but stayed its effect until January 1, 1977, permitting the fishermen to continue taking porpoise during commercial fishing operations. A subsequent Court of Appeals decision in January 1977 confirmed that after the expiration of the stay, tuna fishermen were forbidden to take porpoises until new regulations were promulgated and a new general permit issued, following a formal administrative hearing.

The Motor Vessel, THERESA ANN, et al. v. Richardson, Civil Action No. 76-963-E (U.S.D.C., Southern District of California and Ninth U.S. Circuit Court of Appeals)--In October 1976, NMFS announced that tuna fishermen could no longer take porpoises during yellowfin tuna purse seining in 1976 because the annual quota had been reached. Plaintiffs sought injunctive relief from the effects of the ban and also sought damages on the grounds that property was being taken from them without due process of law. After two weeks of temporary relief, the injunctive relief was denied on November 10, 1976. The decision concerning the damage action had not been reached by the beginning of 1977; in January 1977, a preliminary injunction was granted permitting the short term take of porpoises by tuna fishermen. This decision was immediately contested by the District of Columbia Circuit Court stating that porpoises were not lawfully to be taken under the preliminary injunction of the California District Court.

U.S. v. Mitchell and Hope (U.S.D.C., Southern District of Florida)--Defendants, U.S. citizens who did not possess a permit issued under the Marine Mammal Protection Act, were arrested for capturing porpoises in Bahamian waters for shipment and sale to public display facilities in other countries. In November 1975, Mitchell and Hope were indicted as co-conspirators. Mitchell and Hope were both convicted and sentenced to confinement, with probation. Appeals are pending to the Fifth U.S. Circuit Court of Appeals.

State of Washington v. Sea World (U.S.D.C., Western District of Washington)--In March 1976, the State of Washington brought suit against the Department of Commerce and Sea World, seeking the release of six killer whales captured in Puget Sound under a public display permit issued pursuant to the Marine Mammal Protection Act. During the course of the hearing, an agreement was reached by the parties; the case was dismissed as part of the settlement. Sea World agreed to release the captured whales and not to exercise its right under the marine mammal permit to take any killer whales within Washington State waters.

IPSFC Case (U.S.D.C., Western District of Washington)--Plaintiffs were Indian tribes possessing treaty rights in the State of Washington, as defined in the 1974 decision of Judge Boldt in U.S. v. Washington. Plaintiffs sought to prevent the State of Washington and the U.S. Government from enforcing the regulations of the International Pacific Salmon Fisheries Commission (IPSFC) that deprived the treaty Indians of their rights under the original Boldt decision. A temporary restraining order was issued by the Court allowing treaty Indian tribes to fish 5 days per week, instead of the about 2-1/2 days permitted by the IPSFC regulations. The Order was subsequently modified to permit a 3-day per week Indian fishery. The main issue was ultimately never decided because the salmon run for that year had ended. However, the Court ordered an equitable adjustment for the treaty Indian tribes because they were denied an adequate number of fishing days in the IPSFC fishery.

The Office of General Counsel participated in a number of hearings, including formal adjudicative hearings under the Marine Mammal Protection Act on (a) the proposal to waive the moratorium to allow the importation of Cape fur sealskins from South Africa, (b) on the joint proposal of NMFS and the Fish and Wildlife Service to waive the moratorium on certain species of Alaska marine mammals and to return management of those species to the State of Alaska, and (c) the proposed 1977

regulations governing the incidental take of porpoises during yellowfin tuna purse-seine operations. In addition, the first civil penalty hearing under the Marine Mammal Protection Act was held in connection with an unlawful importation of a marine mammal product. Furthermore, an administrative appeal of a formal administrative decision was held pertaining to the construction-differential subsidy contract of the vessel, Royal Sea.

The Office of General Counsel participated in international negotiations, including those involving the proposed comprehensive Law of the Sea Convention, the North Pacific Fur Seal Convention, International Whaling Convention, and a number of fishery agreements affected or inspired by the Fishery Conservation and Management Act of 1976.

NOAA attorneys have been actively involved in the implementation of the Fishery Conservation and Management Act and have advised the Regional Fishery Management Councils. They have also appeared at Congressional oversight hearings, industry meetings and conventions, and other public meetings to explain the NMFS interpretation of the Act.

MARINE FISHERIES ADVISORY COMMITTEE

The Marine Fisheries Advisory Committee (MAFAC) was established February 17, 1971, by the Secretary of Commerce under Reorganization Plan No. 4 of July 1970 and Executive Order 11007, Section 3b, Act of July 1, 1954 (15 U.S.C. 713-3(c)). The Committee Charter was renewed on January 3, 1973, and again on December 20, 1974, as required by Public Law 92-463. MAFAC members are appointed by the Secretary to advise on matters pertinent to the Department of Commerce's responsibilities for marine fisheries resources.

The Committee held three meetings: February 24-26, 1976, in New Orleans, La.; May 24-26, 1976, in Washington, D.C.; and October 20-22, 1976, in New Orleans, La. In addition, one meeting of the MAFAC Subcommittee on the National Plan for Marine Fisheries was held on February 23, 1976; three meetings of the Subcommittee on Marine Recreational Fisheries were held: February 25, 1976; May 24, 1976; and October 20, 1976. Two meetings of the MAFAC Subcommittee on Planning for Extended Jurisdiction were held on April 27-28, 1976, and July 27-28, 1976, both in Reston, Va.

As of December 31, 1976, the Committee had 27 members. The membership was:

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